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ABSTRACT

This book, written for teachers by teachers, includes articles by 14 contributing authors and is divided into three sections. Section 1 is entitled "Practical Pointers for Team Sports" and contains the following chapters: "Mainstreaming the Physically Handicapped for Team Sports" (S. J. Grosse); "Program Guide to Team Soccer for the Mentally Handicapped" (J. Dover, D. Szymanski); and "Wheelchair Basketball: Individual Skills and Drills" (R. Smith, E. Owen). Section 2, entitled "Practical Pointers for Individual/Dual Sports," contains the following chapters: "Bowling for Individuals with Disabilities" (Young American Bowling Alliance); "Golf" (J. Cowart); "Gymnastics Instruction" (K. Allen); "Mainstreaming the Disabled for Individual Sports" (S. J. Grosse); "Pickle-Ball: A Fun Court Game for Everyone" (J. U. Stein); "Principles and Practices for Championship Performances in Wheelchair Field Events"; "Principles and Practices for Championship Performances in Wheelchair Track Events"; "Sports Adaptations for Students with Crutches: Badminton, Golf, Archery, Tennis" (J. Cowart); "Sports Adaptations for Unilateral and Bilateral Upper-limb Amputees: Archery, Badminton, Baseball, Softball, Bowling, Golf, Table Tennis" (J. Cowart); "Teacher-made Adapted Devices for Archery, Badminton, and Table Tennis" (J. Cowart); "Teaching Tennis to Students with Disabilities" (R. Hester, B. Parks); "Track and Field for ALL Persons" (S. J. Gavron); and "Weight Training for Wheelchair Sports." Section 3, "Practical Pointers for Organization and Administration," contains the following chapters: "Computer Applications in Physical Education and Sport for the Disabled" (J. U. Stein); "Planning and Implementing Intramural Programs for Special Populations" (S. J. Grosse); and "Safety and Injury Prevention for Persons with Disabilities" (T. J. Birk). (LL)

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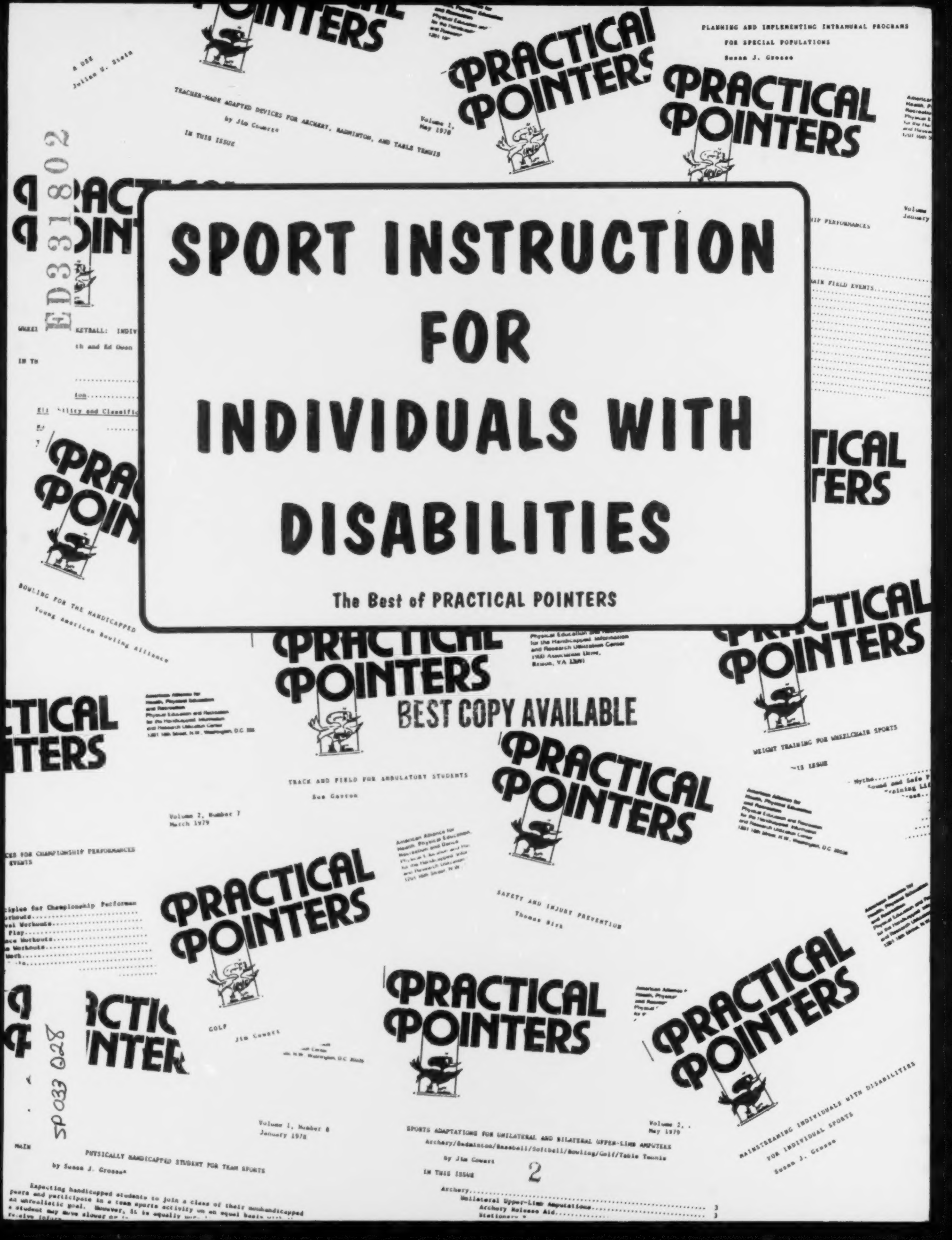
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SPORT INSTRUCTION FOR INDIVIDUALS WITH DISABILITIES

The Best of PRACTICAL POINTERS

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SPORT INSTRUCTION FOR INDIVIDUALS WITH DISABILITIES

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SPORT INSTRUCTION FOR INDIVIDUALS WITH DISABILITIES

The Best of PRACTICAL POINTERS

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SPORT INSTRUCTION FOR INDIVIDUALS WITH DISABILITIES

The Best of PRACTICAL POINTERS

Introduction

From 1977 through 1982 the Information and Research Utilization Center, Unit on Programs for the Handicapped of the American Alliance for Health, Physical Education, Recreation and Dance, published a series of monographs entitled, PRACTICAL POINTERS. Dr. Julian U. Stein, then director of the unit, compiled a vast array of teaching techniques, activity adaptations, equipment modifications, programming information, coaching hints, skill development strategies, and curriculum data. He searched for practitioners in the field to author POINTERS in their particular area of expertise. Where a need for information existed and no author was available, Dr. Stein researched and wrote the material himself. The result was 60 monographs published in five volumes.

In 1989, 20 original POINTERS were compiled and published in book form. *The Best of Practical Pointers* contained practical information written by teachers for teachers. Contents were a result of real life teaching experiences with special populations. A wide range of activities were covered, with the exception of team and individual sports.

Sport Instruction for Individuals with Disabilities: The Best of Practical Pointers, continues the POINTER tradition. The "best" of the original sports POINTERS are included. More important, new POINTERS have been added. Opportunities for individuals with disabilities to participate in instructional sport programs have increased greatly over the past decade. What practitioners in the field learned while providing these opportunities is now shared here in newly developed written material. Again, teachers have written for teachers. Practical information is being passed on, enabling continued growth and expansion of opportunities for special populations.

The Adapted Physical Activity Council of the Alliance, with the cooperation of the Alliance Publications Department and the Alliance Archives, presents this publication to assure this valuable information remains and continues to be available to the profession. Sincere appreciation is expressed to Dr. Stein for his time, talent, and expertise in developing the original series. Gratitude is due to authors of the original POINTER series, pioneers in their field, who not only had the creativity and innovative spirit to develop techniques, but also a willingness to share with others. Commendation is also given to authors of newly written POINTERS. They, in their committment to their task, carry on the POINTER tradition for generations of future professionals and the individuals with disabilities they will serve. THANK YOU one and all!

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YOUNG AMERICAN BOWLING ALLIANCE – located at 5301 S. 76th Street, Greendale, WI 53129 (414) 421-4700, is committed to making bowling a sport for ALL to participate in.

UNAUTHORED MATERIAL – some of the POINTERS in this collection are unauthored. They represent the work of Dr. Julian U. Stein.

Content Reference Matrix

The information contained in POINTERS in this collection can be applied to a wide variety of teaching situations involving individuals representing a great diversity of handicapping conditions. This Content Reference Matrix has been designed to assist readers in locating needed information quickly. Primary application of a POINTER is indicated by a "1". Secondary application is indicated by a "2". These distinctions are not meant to be exclusive. Rather, they are merely a guide in focusing attention and interest.

	PAGE NUMBER	Competition	Computers	Equipment	Mainstreaming	Organization/Admin.	Safety	Archery	Badminton	Basketball	Bowling	Conditioning	Dance	Flag Football	Floor Hockey	Golf	Gymnastics	Pickleball	Self-Defense	Shuffleboard	Softball/Baseball	Soccer	Table Tennis	Table Games	Tennis	Track/Field	Weight Training	Wheelchair Slalom	Wrestling
SECTION 1: Team Sports																													
Mainstreaming the Physically Handicapped for Team Sports					1	2	2			1				1	1						1	2							
Program Guide to Team Soccer for the Mentally Handicapped				2		2																1							
Wheelchair Basketball: Individual Skills & Drills				2			2			1		2																	
SECTION II: Individual/Dual Sports																													
Bowling				2							1																		
Golf				2												1													
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Mainstreaming the Disabled for Individual Sports		2			1	2		1	1		1					1	1		1	1			1		1	1	1	1	1
Pickleball: A Fun Court Game for Everyone				2														1											
Practical Pointers for Championship Performance in Wheelchair Field Events		2										2														1			
Practical Pointers for Championship Performance in Wheelchair Track Events		2										2														1			
Sports Adaptations for Students with Crutches: Badminton, Golf, Archery, Table Tennis				1	2			1	1							1							1						
Sports Adaptations for Unilateral and Bilateral Upper-Limb Amputees: Archery, Badminton, Baseball, Softball, Bowling, Golf, Table Tennis				1	2			1	1							1					1		1						
Teacher Made Adaptive Devices for Archery, Badminton, and Table Tennis				1	2			1	1														1						
Teaching Tennis to Students with Disabilities		2		1	1		2																		1				
Track and Field for ALL Persons		2		1	1																					1			
Weight Training for Wheelchair Sports							2				1																1		
SECTION III: Organization and Administration																													
Computer Applications in Physical Education and Sport for the Disabled			1	1		1				2	2	2				2					2		2	2	2	2			
Planning and Implementing Intramural Programs for Special Populations		1	2		2	1																		1					
Safety and Injury Prevention for Persons with Disabilities					1	1	1					1															2		

Section I

Practical Pointers for Team Sports

PRACTICAL POINTERS

MAINSTREAMING THE PHYSICALLY HANDICAPPED STUDENT FOR TEAM SPORTS

Susan J. Grosse

Expecting handicapped students to join a class of their nonhandicapped peers and participate in a team sports activity on an equal basis with them is an unrealistic goal. However, it is equally unrealistic to assume that because a student may move slower or in a different manner, possibly think slower, or receive information from altered sensory data that participation in team sports with nonhandicapped students is impossible. Assignment to study hall or relegation of handicapped students to score keeping duties is no longer an acceptable alternative to appropriate physical education instruction in team sports.

With instructional emphasis on individual skill development and a class atmosphere that encourages all to participate to the best of their abilities, mainstreaming can flourish and everyone involved can benefit. It is at the upper elementary and middle or junior high school level that foundations in team sports skills are established in class and applied during intramural programs. Whether the handicapped student is to go on and participate in varsity athletics in high school or join an adult wheelchair sports program, he/she needs the same instructional opportunities as nonhandicapped students. Whether the individual is to become a sports announcer or a television football fan, he/she still needs a basic knowledge of how the game is played.

Nonhandicapped students have always had this opportunity. Now, with the current emphasis on mainstreaming, handicapped individuals can have this chance also. Following are some practical pointers designed to facilitate mainstreaming the impaired, disabled, or handicapped student into regular physical education classes during instruction in team sports.

General Class Organization and Instruction

- Establish an atmosphere of acceptance of all students in the class, emphasizing the abilities of each student and the positive contributions each can make to the team effort.

- Individualize instruction by allowing each student to perform the standard skills in the most functional manner possible for him/her.

- Give each physically handicapped student responsibility for the care and maintenance of his/her own special equipment. Vigorous activity does tend to loosen screws, bolts, etc., on crutches and wheelchairs. For safety's sake, students must keep their equipment in good repair. It may also be helpful to keep a small tool kit--pliers, screw driver, heavy tape, extra wing nuts--available for emergency situations.

Students at Courage Center (Golden Valley, Minnesota) participating in floor hockey

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* Make physically handicapped students aware of and expect them to observe safety precautions relevant to their situation: For example:

- As in the rules for wheelchair sports, footrests should be used at all times.

- Students who need seatbelts for support in their wheelchairs should be sure to have them on and properly adjusted at all times.

- As in wheelchair sports rules, competitors may not raise their hips off the seats of chairs at any time. Otherwise a rules violation is called for unfair advantage.

- Students in wheelchairs should be expected to propel themselves and keep their chairs under control at all times.

- Students should be encouraged to use special sports wheelchairs if they are available. Note: Schools may wish to have several chairs of this nature available for student use if wheelchair-bound students will be in their program on an ongoing basis.

- Students on crutches should not be allowed to use their crutches as implements of the sport involved. They should be used for support and locomotion only. In situations of contact of one student's crutch with an opponent's body, a foul is charged against the player who initiated contact; i.e., tripping or hitting on the part of the crutch user as well as holding or tripping on the part of the opponent.

* All students should be required to participate in pre-play activities such as:

- General physical conditioning.

- Specific class warm-up activities.

- Learning how to fall, especially if the student uses a wheelchair or crutches. Falling is not a disaster. Everyone who has played a team sport has fallen at some time or other. However, students with crutches or a chair need to learn how to fall safely and then untangle and get back in the game as soon as possible.

- Chalk-talks or verbal explanations. Even if the student cannot see or hear the entire presentation they can still achieve some benefit from what they pick-up with their other senses.

- Skill drills and individual practice.

* Do not make the mistake of excusing or excluding students from a facet of instruction because you think that they may not understand or benefit from it. Rather, encourage students to obtain as much information and development as they can. Remember, a teacher's expectations often dictate just how much a student will learn. Don't hinder your student's chances by setting your expectations too low.

Drills and Skill Practice

There are essentially two types of drill and skill practice methods commonly used in team sport instruction--stationary practice and moving drills. For stationary practice all students should be able to participate on a fairly equal basis. Students perform the skill as taught using their own equipment and their own individual space in the gym. Those students who catch on to the explanation quicker or who move faster may get more practice done than others, and some students will certainly need more individual help. However, stationary practice is something in which all can participate. Some examples of stationary practice are:

Basketball--passing against a wall.

Softball--pop flys, throwing and catching to self.

Volleyball--volley against a wall.

Soccer--kick to wall and trap the return.

Football--directional maneuverability within a limited space.

Floor hockey--passing to the wall and stopping the return.

None of these activities requires interaction with another player and, as a result, each student is able to function at his/her own particular level of speed and ability, while still developing skills necessary for game play.

Moving drills require students to apply skills learned during stationary practice either through interacting with other players or in situations involving movement around the playing area. Examples of moving drills might include:

Basketball--dribble and shoot relay.

Softball--base running relay.

Volleyball--partner set and spike practice.

Soccer--moving pass drill.

Football--offensive play drills.

Floor hockey--dribble and hit to goal area drill.

To organize these drills so that everyone gets maximum practice on levels with individual ability, it might be helpful to:

- Provide for an even distribution of students with different handicapping conditions among squads or drill units. Having some strong students combined with some students who may need a little more work will keep the groups moving at a more even pace. It will also provide good student models for each group and give the teacher an opportunity to circulate throughout the class to monitor performance and give help, instead of tying the teacher to one slow group.

- * Give special consideration to students who are obviously less mobile than the rest of the group by:

  - . Placing them in a squad whose total number of students is less than the others to help equalize the time needed for performance of relays and shuttle activities.

  - . Having a less mobile student go second or third during a relay rather than last (emphasizing their slowness) or first (getting the group off to a slower start than the others).

  - . Designing drills where mobility-limited students can remain in one place, with the rest of the group rotating around them.

  - . Using the station method, where each student does a moving drill but at his/her own individual pace at a particular station in the gym.

  - . Designing a circuit system based on skills being developed, and then have students work the circuit relative to their own level of functional ability.

- * Emphasize with the students that the purpose of a drill is to help each individual student develop his/her own sports skills. Though some drills can be made to be competitive, it should be remembered that their primary purpose is for skill learning.

Game Play

Application of skills learned during stationary practice and skill drills comprises the bulk of any team sports unit, and just as the nonhandicapped child needs to have opportunities to play team games, so does the handicapped student. At this particular level emphasis should be on learning rules and strategies of the game and how to combine the skills of all players into a team effort. Class should not be a highly competitive experience. Rather, intramural activities should be provided for those students who wish to play the game in a more competitive form. To facilitate the participation of the handicapped student in both class and intramural settings, the following might be helpful:

- * Emphasize everyone's positive contribution to the team effort--what each player can do well, not what he/she does poorly.

- * It may be necessary to remind players to play only their own positions to keep more able or skillful players from monopolizing the game.

- * Arrange a fairly equal distribution of abilities when assigning teams.

- * Assign fairly equal ability players in directly opposite positions.

- * Use less mobile students for positions that do not require them to cover the entire court. For example, floor hockey--fullback; touch football--offensive guard.

- Use less skilled students for specialty skills, such as the designated hitter in softball, and have them concentrate on developing just those special skills.

- Switch the playing surface from grass to something smooth to accommodate wheelchairs.

- Develop coaching and officiating as student functions, especially for severely physically handicapped students (i.e., severe muscular dystrophy) who may have the intelligence and interest in sports but who are extremely limited in performance.

- Assign each player a specific function on the team for special play situations. For example, putting the ball in play from out-of-bounds.

Each student in class should be allowed the opportunity to play on a team for relatively the same length of time. Five minutes of play for one student and the entire class period for another is neither fair nor instructionally sound. If the emphasis is on each student's positive contribution to the team, then the time spent in play will be both educational and enjoyable.

Student from Alameda (California) Public Schools uses an adapted badminton racket to participate with his peers.

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Specific Team Sports

Individual team sports each present their own unique opportunity for learning. A good team sports program contains a variety of activities, and all students should be exposed to this variety. Each sport may, however, present different problems to the handicapped student who is mainstreamed. Some special considerations relative to particular team sports are discussed in this section.

BASKETBALL

Child with Larsen's Syndrome plays basketball on ZOOM, children's television show.

- Use less mobile players to take in out-of-bounds balls.
- Use less mobile players or an especially good shooter as the front court player on a fast-break play.
- Use a player in a wheelchair or on crutches as the player at the head of the lane in a diamond zone defense. He/she will take up more space and make an excellent obstacle.
- Apply wheelchair basketball rules where appropriate, such as:
  - For a player in a wheelchair a dribble means one bounce of the ball followed by one or two pushes on the wheels of the chair. The ball may be held on the player's lap during pushes.
  - Unlimited glide privileges are allowed during the dribble, provided a charging foul does not occur.
  - A walking student cannot tie a ball with a student in a wheelchair; however, the held ball and close guarding rules do apply.

FLOOR HOCKEY

- Use a soft rubber puck rather than the plastic ball or puck to slow down the pace of the game and encourage the use of particular skills.
- If a student is unable to hold a hockey stick it can be attached to the foundation of the wheelchair by putting solid support inside the stick and clamping it onto the chair.

FOOTBALL

- Use less mobile players as offensive guards to block for the quarterback.
- Attach rip flags to the sides of the wheelchair rather than to the person, where they might be inaccessible.
- Apply wheelchair football rules where appropriate. For example:

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. Blocking is allowed from the front only. No blocking is allowed from the side or back, and no blocking is allowed on the large wheels.

. Substitute a pass or throw for a kick on the opening play or on fourth down.

. Substitute a single play from the three yard line for the point-after kick. If a running play succeeds, two points are awarded; if a passing play, one point.

SOCCER

* Allow wheelchair bound students to use their footrests to move the ball.

* Do not allow students using crutches to hit the ball with them; they can use their feet too.

SOFTBALL

* Allow a player to bat but not run. Have another player run the bases, or at least run to first base where the batter then again becomes the runner. This will allow a less mobile student the chance to become an asset to the team with good hitting and yet not cause lack of speed to become a liability.

* Allow the batter the choice of several types of bats. Sometimes a light aluminum or plastic bat may be easier to use, in which case one would need to switch balls also--just for that batter.

* When judging base running, a crutch or wheelchair wheel may be counted as touching the base rather than a foot.

* Allow the batter a choice of underhand or overhand pitching.

* Establish the practice of base coaches early so that those students who are easily confused will have help in the learning situation.

* Put a mobility impaired play in the third base or catcher position where less mobility is required.

* Do not allow players on crutches to use a crutch as a bat. Have them either drop one crutch (and have someone else run to first while they pick it up and then resume their position as runner) or have them let it hang from an arm while they bat.

Most team sports involve use of hands and arms. As a result some students who normally use crutches may prefer to use a wheelchair for sports participation to free their upper extremities. This is a perfectly acceptable alternative, particularily in light of the recent development of adult wheelchair sports programs. Students who become proficient at playing a team sport from a wheelchair will have skills which allow them to participate in this sport in their leisure time after school.

PRACTICAL POINTERS

PROGRAM GUIDE TO TEAM SOCCER FOR THE MENTALLY HANDICAPPED

John Dover and David Szymanski

An initial investigation into the literature on soccer for the mentally retarded provided little information on how to plan, develop, implement, conduct, and evaluate such a program. However, the literature is replete with information on the therapeutic benefits of recreation and athletics for this population. How one utilizes the latter and applies it to the lack of instruction in the former is the challenge of this PRACTICAL POINTER.

Soccer is particularly well-suited for all special populations for several reasons. First, participants of varying skill levels can comfortably play along side one another because the nature of the game is truly team-oriented. When compared to other activities, particularly individual sports, such as tennis, the responsibilities of being a team member are more equal. During the game, individuals are not, as they so often are, "put on the spot," e.g., the batter in baseball who may strike out. The team effort in soccer balances the range of abilities found among a group of retarded individuals. In soccer, individual failures are not emphasized, and successes are more easily shared by the entire team.

Second, the physical size of the participant is not necessarily an advantage or disadvantage in soccer. The action of the game enables a maximum number of participants to actively participate regardless of whether they have control of the ball or not. Third, soccer offers advantages because it is most frequently played outdoors. The fresh air, combined with a change of seasons, offers opportunities for related learning such as dressing for the weather, preventing illness, etc. Playing in the out-of-doors permits the level of noise to rise above the plateau permitted inside and offers the flexibility to let off steam, scream at the top of one's lungs, and thus release tensions and frustrations. Yet, in the event of inclement weather, practice sessions can also occur indoors, e.g., in a gymnasium, if appropriate adaptations are made, such as deflating the ball to reduce its increased tendency to roll on the hard floor.

INTRODUCTION

On the pages that follow is the information necessary to develop a complete soccer program for a group of mentally retarded individuals. This is not a theoretical program; rather, it is one which has been field-tested under the direction of the primary author with a group of retarded individuals in the city of Lawrence, Kansas.

While the program can possibly stand additional modifications particularly in some options within each session, the plan offers a successful approach to preparing retarded individuals in soccer participation. We would encourage those individuals who find new alternatives to the individual sessions and offer assistance in furthering the program.

Prior to looking at actual sessions, it is important to discuss philosophy and define words used in the text. The game of soccer should be structured to promote its competitive spirit. While each session was used to promote specific ends, (learning the game of soccer, learning about recreation and its benefits, and promoting physical, mental, and social health) the focus of the 16 weeks of involvement was the participation in a competitive event where one team would win and the other would lose. Thus, no attempt was made to modify any rule or change any terminology so as to reduce or eliminate the element of competition. There was a conscious effort to make each individual associated with the program learn the game correctly. This was accomplished by building subsequent sessions upon skills previously learned.

While a successful soccer program can be operated with persons of any age, those feelings have yet to be proven. The program in Lawrence, Kansas included mentally retarded men and women working in a sheltered workshop and living in a sheltered home. They were adults ranging in age from 18-65 with a mean of 34 years of age. According to the A.A.M.D. standards, they would be classified as upper range trainables and lower range educables.

The word "season" is used throughout the guide. A season is approximately seven weeks long. It should begin in late summer and end in early fall. The point is to introduce soccer following the hottest part of the summer. This offers the advantage of beginning the season while the weather is usually more conducive to outdoor activity, plus, the season can then be completed prior to the extremely cold winter months. Additionally, the interest in soccer at this time of the year could parallel the renewed interest in both professional and collegiate sports.

Sessions 1-10 are structured in such a way so as to introduce a new concept(s) each week. The format for each session, unless stated otherwise, should follow this pattern: warm-up exercises as recommended in Session 1; review of previously taught skills; preview of new skills to be taught; D.D.A.D. (Describe, Demonstrate, Ask for Questions, Do it!); trial and error adding necessary corrections; requesting one individual to demonstrate the skill to another, or the group; practice; review of new skills taught; run and/or group walk; evaluation of behavioral objectives; relaxation.

The Appendices are evaluation and reference materials to be maintained and supplemented from season to season. Thus, this guide should be utilized to initiate a soccer program, as well as to permit the program to be established on a long-term basis.

It is important to remember that a particular individual may not know the meaning of a particular term or concept. The coach should know the meaning of all the terms and concepts to be taught and learned. If unfamiliar with the client's abilities, he/she should institute an assessment process which would determine the client's ability to perform a particular task. This will lessen any frustration a client may experience from not having been taught a preliminary skill.

To participate in soccer, a client needs to know the body parts, e.g., toes, feet, hands, head, chest, etc., directionality, grasping, kicking, throwing, and catching. These should be learned prior to embarking upon any area of this soccer program. A preliminary program could be established to determine if the client has mastered these preliminary skills. Again, the intent of this programming guide is to foster success in the game of soccer, and for the game to have specific therapeutic benefits for the clients.

OVERALL GOALS

The overall goals for the season are:

- to present such session so as to build upon the successful learning which occurred in the previous session;
- to promote confidence in soccer in such a way that it can transfer into other areas of a client's life;
- to develop team spirit in which each participant is enriched by feelings of belonging to the group;
- to promote an attitude which is less self-centered.
- to improve the participant's physical condition and health.
- to work within an enjoyable, fun atmosphere.

BEHAVIORAL OBJECTIVES FOR THE SEASON

1. Each player will show achievement of specific skills of the game, by meeting the criteria of at least four of the eight individual session objectives (use Appendix B, the Program Checklist).

2. The team will demonstrate knowledge of the game's rules by playing at least two 48-minute matches, in which they commit no more than one major foul, two minor fouls, and five minor infringements, i.e., hand ball.

3. Each player will feel that he/she is a part of the team, as evidenced by the player referring to some action of the team with a nominative,

plural, first person pronoun, i.e., "we", "ours", and "us", in any or other communication throughout the season.

PREPARATION

Before the season begins, the following items should be addressed: scheduling of sessions (see Appendix E); travel arrangements; purchasing of equipment; securing of referees when necessary.

EQUIPMENT

The following materials will be needed at every session: Program Checklist (Appendix B); pencil; first aid kit; two soccer balls (except at Session 1); one headband per player (except for Sessions 1, 2, and 4). (Note: see Session 4, Goal 3, for an explanation of the function and use of the headband.)

Optional Equipment

While the following equipment was considered optional, they contributed to the success of the individuals and to the success of the overall program. The purchase and/or construction of the following items is recommended: uniforms; whistle; clipboard; goal posts; protective pads; 16 mm loop film projector (can be rented or borrowed); films (as noted in text).

SESSION 1

Week 1, Day 1

45-minute Team Meeting

GOALS

1. Set tone and expectations for the team.

2. Encourage effort from the players.

3. Learn the warmup procedure.

ACTIVIES

Minutes

15 Fill out the following sections of the Checklist (Roster and the first two columns of Needs Assessment) and, as with every session, mark Sessions Attended appropriately.

5 Deliver an enthusiastic talk on the rationale for playing soccer, making clear the following points about the game: though it may be a new sport, it is very popular -- indeed, a tradition -- in many other countries; there is constant action; everyone is involved, and works hard, whether or not they have the ball; it is a

true team sport -- everyone must work together; any size person can play successfully.

Session Objective #1

Each player will be able to list one of the five points made on the rationale for participation in soccer, when questioned by the coach immediately after the talk, to show knowledge of a reason for playing soccer.

25 For each warmup exercise explain briefly, demonstrate, practice, and work individually on players' form, until they demonstrate, to the coach's satisfaction, the best form that they are capable of at this time.

The warmup exercises are conducted in a single circle formation. Between exercises, everyone should clap and offer encouragement to each other. Each session, a different player is chosen to lead warmups. Warm-up consists of the following exercises (with their usual time allotment in parenthesis) and with the understanding that some may possess a greater physical condition:

1. Stretching (1 min.). In any manner desired, stretch arms, legs, and trunk.

2. Jogging (2 min.). Jog the length of the field and back, at individual's pace.

3. Jumping Jacks (30 sec.). Do ten.

4. Swings (30 sec.). Raise arms straight overhead. Bending at the waist, swing arms between legs and back to the overhead position, in one swooping motion. Do ten.

5. Propellors (30 sec.). Extend arms to the sides. Bend at the waist, until back is parallel to the ground. Rotate trunk and arms from one side to the other, as far as possible. Do ten.

6. Breathing (90 sec.). Lay face-up on the ground, with eyes closed. On cue, breathe in deeply, and hold for 10 seconds. Exhale, and relax. Do this five times. For inspiration, emphasize getting air deep into the body, by expanding the muscles of the abdominal cavity. For expiration, emphasize contraction of abdominal muscles.

7. Leg Lifts (90 sec.). Still lying face-up, point toes and raise both legs six inches off the ground, keeping knees straight. Hold there for 10 seconds, then relax. Do five.

8. Kicks (30 sec.). From the standing position, kick leg as high as possible, keeping knees straight and toes pointed. Do five, for each leg.

9. Running (90 sec.). Run the length of the field and back, as fast as possible. At the end of each session, it is suggested that the clients run the length of the field and return running to the beginning position. Soccer is a running game; thus, it is necessary to become accustomed to this level of participation.

Following the run, it is important to "tone down" the activity and the participant. This can be facilitated through a group walk. A group walk entails the entire team walking the length of the field and back with the coach, thus, providing the opportunity for a passive toning-down activity. During this time, the coach may review the day's session, preview the next session, or simply chat informally with the players. Finally, the group walk should stress the positive contributions of each player and how each facilitated the overall team's goals. All corrections should be handled during the practice and on the field. The final activity of any session should leave the clients feeling good about their contribution to themselves and to the team.

SESSION 2

Week 1, Day 2

1-hour Practice

GOALS

1. Improve warmup skills.
2. Learn to trap the ball before kicking it.
3. Learn to pass with the inside of the foot.
4. Learn not to touch the ball with hands.

ADDITIONAL EQUIPMENT

Films #1 and #2, of the Sports Techniques Loop Film Series on soccer, by The Athletic Institute, 805 Merchandise Mart, Chicago, IL 60654; loop film projector.

ACTIVITIES

Minutes

1 Review the rationale for participation in soccer. Preview kicking and trapping.

5 Show Loop Film #1, "Kicking", two times. For the inside of instep kick: approach ball from slight angle; keep eyes on ball; lean away from kicking foot; bend upper body slightly forward; plant non-kicking foot 10 inches from ball; turn kicking foot

outward and downward; use knee muscles; contact ball inside of instep; follow through.

For full instep kick: keep eyes on ball; plant non-kicking foot 6-8 inches from ball; turn kicking toe downward; contact ball on top of instep; pull forward with abdominal muscles.

5 Show Loop Film #2, "Trapping", two times. For sole of foot: keep eyes on ball; trap ball between ground and sole of foot; bend knee and depress heel.

For side of foot: keep eyes on ball; bend knee; let leg hang loose; trap ball by letting it bounce off foot 1-2 feet in the direction it is intended to go.

10 Warm-up.

2 Demonstrate inside of instep kick, sole trap, and side of foot trap.

18 Circle Drill. Everyone forms a circle. One player calls out the name of another player who is on the other side of the circle, then passes the ball to that player with an inside of instep kick. The player whose name was called receives the pass using either a sole trap, or side of foot trap. Once the ball is trapped, that player calls out someone else's name, passes to them, and so on.

Session Objective #2

Each player shall demonstrate ability to perform the primary skills of the circle drill by, at least once during the drill: receiving a pass by attempting to trap the ball, before kicking it; passing the ball with the inside of the foot.

15 Lead Drill. Two lines are made with players facing the same direction, standing 5 yards apart. Player A passes ball, with inside instep kick, in front of player B who is jogging straight down the field. A then runs straight down the field. B receives the ball using a trap, and then passes back to A, and so on, until each player has made three passes; then the ball is kicked back to the line (see Diagram 1). Stress: trapping before kicking; kicking with the inside of the foot; passing the ball to a point in front of the receiver ("lead" the receiver), so that he/she does not have to stop until he/she can touch the ball; keep a constant distance between players as they run straight down the field.

1 Run the length of the field, and back.

3 Group Walk: Review inside of instep kick, side of foot trap, and sole trap. Preview dribbling, and full instep kick.

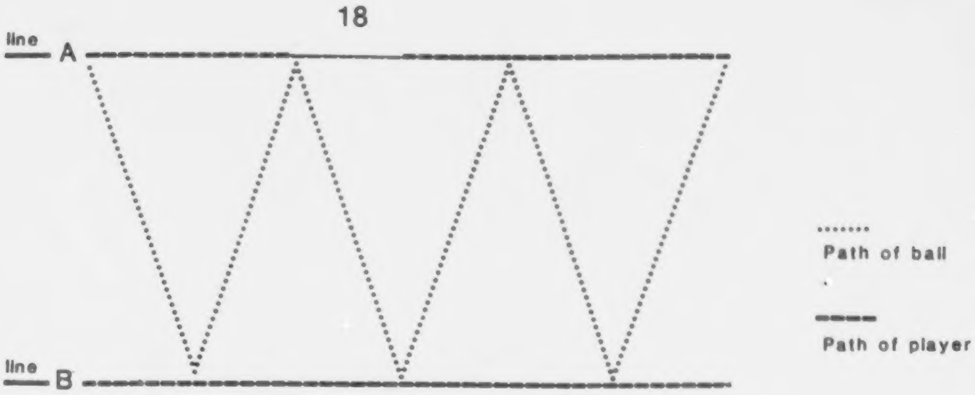


Diagram 1.

SESSION 3

Week 2, Day 1

1-hour Practice

GOALS

1. Improve kicking and trapping skills.
2. Learn how to dribble.
3. Learn to lead, when passing to a moving teammate.

ADDITIONAL EQUIPMENT

Loop Film #5; loop film projector.

ACTIVITIES

Minutes	
1	Review kicking and trapping.
1	Preview dribbling.
5	Show Loop Film #5, "Dribbling." Stress: utilizing all portions of foot; pointing toes out; taking short strides; carrying weight on non-dribbling foot; keeping eyes on ball; keeping ball within one yard of feet.
10	Warm-up.
14	Circle Drill.
1	Demonstrate dribbling.
19	Lead Drill. With the addition, that after both players have

made three passes, one player will dribble the ball back, instead of making a long kick.

Session Objective #3

Each player shall demonstrate ability to control the ball, by dribbling twenty yards without letting the ball get more than four feet in front of him/her, during lead drill.

Session Objective #4

Each player shall demonstrate understanding of lead passing, by kicking two of three passes, during a single turn of the lead drill, in line with what would be in front of the receiver (whether the ball actually reaches the receiver, or not).

5 Demonstrate the full instep kick. Then form two lines and take turns practicing the full instep kick.

1 Run the length of the field, and back.

3 Group Walk. Review the team's progress, in relation to dribbling, passing, and trapping.

Preview shooting and defense.

SESSION 4

Week 2, Day 2

1-hour Practice.

GOALS

1. Improve kicking, trapping, and dribbling skills.

2. Learn to shoot.

3. Reinforce correctly-executed skills.

At every practice session for the rest of the season, the coach will place a headband on each player (to be worn for the remainder of that session), when the player correctly executes any of the emphasized skills. The headband is, then, a "reinforcer" for skills.

ACTIVITIES

Minutes

2 Review skills. Preview shooting.

10 Warm-up.

13 Circle Drill.

Session Objective #5

Each player will demonstrate basic attainment of kicking and trapping skills, by trapping and passing the ball in a manner acceptable to the coach, at least three times during the drill.

12 Lead Drill.

14 Shooting Drill (see Diagram 2). A passes to B, and moves to position X. B traps ball, and passes to A, at X. A traps ball, and shoots for goal.

1 Run the length of the field, and back.

3 Group Walk. Review and comment on shooting. Stress that shots are best when low and kicked with the inside of the toe. Preview next session (more shooting drills, defense).

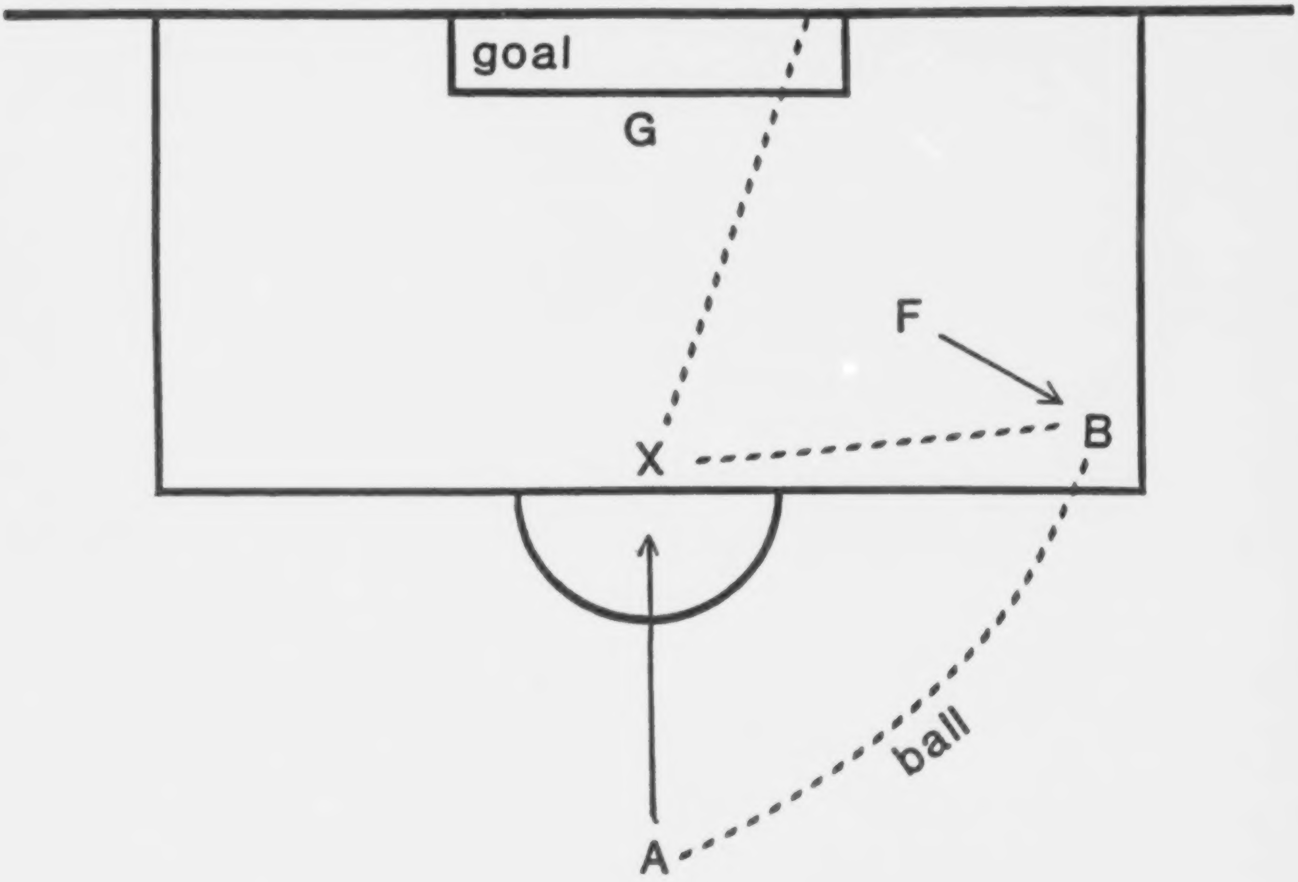


Diagram 2.

SESSION 5

Week 3, Day 1

1-hour Practice

GOALS

1. Improve passing and shooting skills.
2. Learn defensive skills.

ACTIVITIES

Minutes

1 Review shooting, passing, and trapping.

1 Preview defense. Emphasize that one should stay between the ball and the goal, when defending.

10 Warm-up.

13 Circle Drill.

2 Run backwards, half the length of the field and back.

21 Shooting Drill. Add as defensive players, a goalie and a fullback (G and F, respectively, in Diagram 2). Stress: the fullback should go after the ball, at all times, and try to kick it away; the offense should keep spread out, and control the ball until the defensive man comes to the ball, then pass to the open man, who shoots.

Session Objective #6

8 Each player will demonstrate understanding of defensive techniques, by constantly moving toward the ball, in one out of two turns, while playing fullback during these eight minutes of shooting drill.

1 Run the length of the field and back.

3 Group Walk. Discuss shooting.

SESSION 6

Week 3, Day 2

1-hour Practice

GOALS

1. Improve shooting and defense.

2. Introduce the idea of playing a particular position, on the field.

3. To become less self-centered, by learning to pass to an open teammate, instead of selfishly trying to be the one to score.

ADDITIONAL EQUIPMENT

Diagram 3.

ACTIVITIES

Minutes

1 Review the shooting drill.

1 Preview positions and the kickoff.

10 Warm-up.

8 Circle Drill.

7 Lead Drill.

18 Shooting Drill. Same procedure as Session 5, except when it is observed that a player took a shot when the defensive man was on him/her, and the other offensive man was open. When this occurs, the player who shot will be asked to take another turn; the coach will play fullback, and tightly defend the player until he/she does pass.

Session Objective #7

Each player will exhibit unselfish play, by completing one turn of the shooting drill in which he/she passes to his/her teammate (not counting the pass that A makes to B to start the turn), on a turn which does not involve the coach.

1 Explain positions, using Diagram 3.

5 Set up one full team in the starting positions. Explain and demonstrate the kickoff, making the following points: referee blows whistle; the center forward passes ball across the center line to either wing.

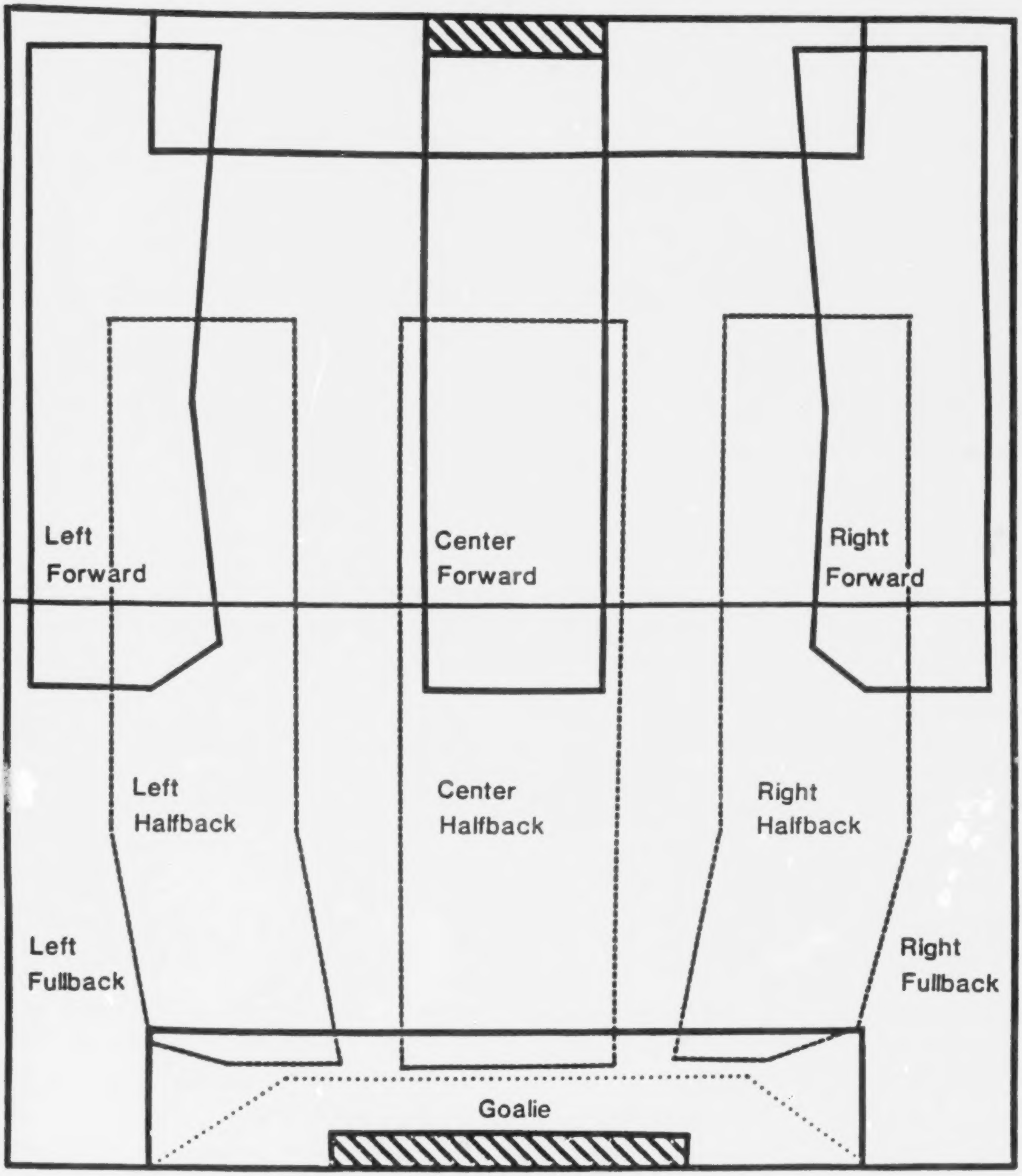
1 Practice kickoff.

5 From the starting positions, walk the team (as a unit) 20 yards forward, then back to the starting positions. Emphasize that each player generally moves in an "alley" to cover his/her area of responsibility.

1 Run the length of the field, and back.

3 Group Walk. Review passing, and positions.

Diagram 3.
Areas of Responsibility:


Left Forward
Center Forward
Right Forward
Left Halfback
Center Halfback
Right Halfback
Left Fullback
Right Fullback
Goalie

SESSION 7

Week 4, Day 1

1-hour Practice

GOALS

1. To continue to improve on all of the previously learned skills (this will be considered a goal in each of the remaining sessions of the season, without further mention).

2. To receive feedback from the players.

ADDITIONAL EQUIPMENT

Appendix A.

ACTIVITIES

Minutes	
1	Review positions.
10	Warm-up.
10	Circle Drill.
10	Shooting Drill.
22	Position Drill. One full team is set up in their starting positions (see Diagram 3). The remaining players, the coach, any assistants, and the goalie form the opposition for an informal scrimmage.
1	Run the length of the field, and back.
5	Group Walk. Discuss any player concerns or comments, and record in Appendix A. Preview uniforms and rules.

SESSION 8

Week 4, Day 2

1-hour Practice

GOALS

1. Learn basic rules of the game.

2. Learn the throw-in technique.

ADDITIONAL EQUIPMENT

Uniforms.

ACTIVITIES

Minutes	
2	Review positions. Preview rules.
15	Outfit each player, and record their uniform size on the Checklist.
10	Warm-up.
5	Circle Drill.
8	Shooting Drill.
2	Explain basic rules, emphasizing no pushing or tripping other players, throw-ins, goal kicks, penalty shots, free kicks, corner throws, and respect for the referee.
15	Position Drill. Include a demonstration of the throw-in, making the following points: stand outside the touch line; use both hands; throw ball overhead; keep both feet on ground.
1	Run the length of the field, and back.
3	Group Walk. Review skills. Preview scrimmage.

SESSION 9

Week 5, Day 1

1-hour for Scrimmage with a college recreation class.

PREPARATION

With the class: cover the goals of the scrimmage; teach the areas of responsibility (use Diagram 3); go through the position drill.

Clean uniforms.

GOALS

1. To stay in one's area of responsibility.
2. Receive individual guidance from the opposition's corresponding player.

EQUIPMENT

Uniforms, ball(s).

ACTIVITIES

Minutes

2 Preview scrimmage. Stress enthusiasm, application of skills, rules, and sportsmanship.

10 Warm-up.

5 Circle Drill.

5 Lead Drill.

15 Scrimmage. As in the case with each of the matches, everyone should receive approximately the same amount of playing time.

7 Half-time break.

15 Scrimmage.

Session Objective #8

Each player will indicate understanding of playing a particular position, if he/she is found to be within his/her area of responsibility, during two out of four checks that the coach will make at 5, 10, 20, and 25 minutes into the scrimmage.

1 Review the strengths and weaknesses of the scrimmage.

SESSION 10

Week 5, Day 2

1-hour Practice

ADDITIONAL EQUIPMENT

Notes for home (see Appendix D).

ACTIVITIES

Minutes

1 Comment on the scrimmage.

10 Warm-up.

8 Circle Drill.

7	Lead Drill.
11	Shooting Drill.
14	Position Drill.
1	Run the length of the field, and back.
3	Group Walk. Preview the upcoming match, and hand out notes for home.

SESSION 11

Week 5, Day 3

75 Minutes for Match

GOALS

1. To incorporate the skills learned in practice into a team effort.

2. To feel excited and gratified about playing on a higher level of competition than was possible at the beginning of the season.

ADDITIONAL EQUIPMENT

Uniforms.

ACTIVITIES

Minutes	
2	Deliver a pep talk, stressing: the achievements and developments of the team; team play; application of skills; sportsmanship.
10	Warm-up.
5	Circle Drill.
12	1st quarter of match.
3	Rest.
12	2nd quarter.
3	Rest.
12	3rd quarter.
3	Rest.
12	4th quarter.

1 Comment on the match.

SESSION 12

(Week 6, Day 1) and SESSION 14 (Week 7, Day 1) follow the same plan as Session 10. SESSION 13 (Week 6, Day 2), SESSION 15 (Week 7, Day 2), and SESSION 16 (Week 7, Day 3), all follow the same plan as Session 11.

The goals for the remaining sessions are the same as those of the previous sessions. The focus is on improvement of the previously acquired skills. The coach should focus upon the skill being done at a higher rate of proficiency. This can include but is not limited to: performing the skill in less time; performing the skill consistently; performing the skill naturally; performing the skill with an awareness of other players; performing the skill and proceeding to the next skill; performing the skill with increased accuracy.

APPENDIX A

PROGRAM RECOMMENDATIONS, COMMENTS, TIPS, OR SUGGESTIONS

Date	Name, Relation to team, e.g., coach, player, referee, spectator	Comment

APPENDIX B

PROGRAM CHECKLIST

Roster: Name, address, telephone	Needs Assessment: Needs tennis shoes, uniform size	Session Objectives Met:	Sessions Attended:
1.			
2.			
3.			
4.			
5.			
6.			
7.			
8.			
9.			
10.			
11.			
12.			
13.			
14.			
15.			

APPENDIX C

SEASON EVALUATION

Player	Positions played	Strengths, and/or areas of noted improvement	Limitations, and/or areas for improvement
1.			
2.			
3.			
4.			
5.			
6.			
7.			
8.			
9.			
10.			
11.			
12.			
13.			
14.			

Season Objectives Met (yes/no):

1. ____
2. ____
3. ____

19___ Schedule:

	Opponent	Played at	Date	Score
1.				
2.				
3.				
4.				
5.				

Practice field:

Date of first session:

Date of final session:

APPENDIX D

SAMPLE NOTE FOR HOME

TO: Parents and houseparents of Cottonwood soccer players.

FROM: John Dover, soccer coach.

DATE: 10/10/80

On Saturday, October 13th, the Cottonwood soccer team will play the Johnson County Center for the Handicapped team at 2:00 p.m., at Shawnee Mission East High School, 95th & Nall Ave. A bus will pick up the following players at their homes, between 11:30 a.m. and 12:15 p.m. (players should already have eaten lunch and be wearing tennis shoes; uniforms will be provided):

James Jones
Sue Veely
Hal Sajoe
Bob Timmons
Dave Trog
Julie Smith
etc.

APPENDIX E

SCHEDULING CONTACTS

In this Appendix, a running list is to be kept of all the names, addresses, and telephone numbers of persons or organizations which have in the past provided opposing teams, or may do so in the future, for the matches or scrimmages. Here are some suggested contacts:

Local park and recreation department, located in the white pages of the telephone directory under the title, "City of ...." Note: most larger cities have a person designated as the supervisor of Sport Activities.

Local, county, or state office for Special Olympics. Access and information to this office can be gained by writing the national office at:

Local, county, or state association for retarded citizens (A.R.C.). The telephone most often appears in the white pages of the telephone directory under Association for Retarded Citizens, or "........... County A.R.C." Further information can be acquired from the national office at:

Sheltered workshop located in the community would be registered with the nearest A.R.C. office. County Division of Social Services (Welfare) may have a registry of local group homes established for the mentally handicapped. The white pages of the telephone directory either under the county or state designation would be the source for a telephone number.

Special Education Director or person responsible for the special education classes in the school district generally can be reached at the administrative headquarters of the district. The telephone number would be located in the white pages, or yellow pages under the title, "schools."

PRACTICAL POINTERS

WHEELCHAIR BASKETBALL:
INDIVIDUAL SKILLS AND DRILLS

Ralph Smith and Ed Owen

The main purpose of this PRACTICAL POINTER is to offer a brief introduction to wheelchair basketball and to outline some basic skills needed for successful participation in this challenging sport. It is appropriate for anyone interested in wheelchair athletics, but is primarily written for those individuals planning to teach, learn, or improve individual wheelchair basketball skills.

As much as possible, we have tried to limit our presentation to techniques unique to wheelchair basketball play. Therefore, a reader who is unfamiliar with able-bodied basketball fundamentals (such as the proper grip when passing the ball or correct use of the fingers while dribbling) should supplement this document with a text on individual skills for able-bodied players.

The information presented in this PRACTICAL POINTER is not complex, but the reader should not assume that it is appropriate only for beginning players. No matter how experienced a player may be, the prerequisite for success in wheelchair basketball is his or her ability to execute fundamental wheelchair basketball skills.

Our intent is to provide the foundation for enjoyable and successful wheelchair basketball participation.

INTRODUCTION

Wheelchair basketball is a fast and exciting team sport. Its popularity can be seen in the recent growth of the National Wheelchair Basketball Association (NWBA). This organization, governed by its member teams, began in 1949 with only six teams. By 1973 there were 98 teams, and now the Association boasts more than 160. This growth reflects the many benefits which wheelchair basketball provides for both participants and spectators.

For participants, a few of the benefits are:

- involvement in organized athletic competition which is basically identical to opportunities available to able-bodied athletes;
- increased physical fitness including strength, endurance, and balance;
- development of skills which aid in performing daily life activities;
- expanded social and cultural experiences through travel to other areas of the country, and even to other nations;
- a better self-concept, developed through successful athletic participation.

For spectators, the benefits include:

- a greater understanding of the many skills and abilities that physically disabled people possess;
- development of a more positive attitude toward all disabled persons;
- expanded social experiences through interaction with disabled athletes and other spectators;
- awareness of architectural barriers which often deny access to physically disabled individuals;
- (for disabled spectators) "coping" models who display skill and success gained through effort and perseverence;
- enjoyment of a well-played, exciting game of basketball.

ELIGIBILITY AND CLASSIFICATION

Membership on a member team of the NWBA is open to any individual who has a permanent physical disability affecting the legs or lower portion of the body, and who because of the severity of his or her disability could not receive comparable benefit from participation in competitive able-bodied basketball. Wheelchair basketball players, therefore, have a wide variety of disabilities, including spinal cord injuries and amputations. The severity of these disabilities also varies, so the NWBA has a classification system, which encourages the participation of more severely disabled individuals.

The three-level player classification system is based upon injuries to the spinal cord at specific vertebrae locations. These locations are in the thoracic and lumbar regions of the cord. Individuals with other disabilities are classified by comparing their limitations to those resulting from spinal cord injuries. Each classification level is assigned a numerical value which is used to ensure team balance in terms of severity of disabilities. The current player classification system and team balance rules are included in Table 1.

RULES OF PLAY

In order to practice individual skills, the player must know which maneuvers are within the rules and which are forbidden. In other words, it is essential that all players and coaches know and understand the rules of play. With few exceptions, the rules of wheelchair basketball are identical to the able-bodied basketball rules established by the National Collegiate Athletic Association. Exceptions to NCAA rules are made to facilitate play in situations unique to wheelchair basketball. These include:

- Traveling. A player may hold the ball while executing one or two pushes on his/her wheels. A push is made when either forward or backward force is exerted upon the wheel (by one or both hands). When a player with the ball takes more than two consecutive pushes (without dribbling, passing, or shooting), a traveling violation is assessed.

- Tilting or Falling. A violation is called when a player who is touching the ball, tilts, leans, or falls in any direction to the extent that the hands, feet, body, wheelchair footrests, or wheelchair anti-tip (safety) casters touch the floor.

- Physical Advantage Foul. A player must remain firmly seated in the wheelchair at all times. Raising from the seat or using a functional leg (or stump), to gain an advantage results in a physical advantage foul. This infraction is treated as a technical foul.

- 5-Second Lane Violation. A player may remain up to 5 seconds in the free throw lane while the ball is in control of his/her team in the front court. Remaining in the lane more than 5 seconds is a violation.

It is not possible to get a thorough understanding of wheelchair basketball rules from this brief description. Readers desiring more details on NWBA rules should order a copy of the Official NWBA Rules and Case Book (see References).

THE WHEELCHAIR

The wheelchair basketball player's sports-model wheelchair is comparable to the able-bodied player's athletic shoes, but has a much greater impact on the player's performance. The make and model of the wheelchair, its seat height, the camber of its wheels, the type and location of the large wheel axles, plus the possible inclusion of a number of extra features must all be

Table 1. Player classification and team balance.

Player Classification

Class I	Complete motor loss at T-7 or above, or comparable disability where there is total loss of muscle function originating at or above T-7.
Class II	Complete motor loss originating at T-8 and descending through and including L-2 where there may be motor power of hips and thighs. Also included in this class are amputees with bilateral hip disarticulation.
Class III	All other physical disabilities as related to lower extremity paralysis or paresis originating at or below L-3. All lower extremity amputees are included in this class except those with bilateral hip disarticulation. (See Class II.)

Team Balance

Each classification will be given a numerical value or factor as follows:

Class I	1 value point
Class II	2 value points
Class III	3 value points

At no time in a game shall a team have players participating with a total of value points greater than twelve (12), nor more than three (3) Class III players playing together at the same time.

given careful consideration when selecting a wheelchair for use in basketball competition. As with athletic shoes, the proper wheelchair is largely a matter of personal preference and price consideration. Many companies sell sports-model wheelchairs, but the following companies supply the majority of wheelchairs used in NWBA competition:

Everest & Jennings, Inc.
1803 Pontius Ave.
Los Angeles, CA 90025

Quadra Wheelchairs, Inc.
31125 Via Colinas
Westlake Village, CA 91362

Production Research Corp.
10217 Southard Dr.
Beltsville, MD 20705

Stainless Medical Products
9389 Dowdy Dr.
San Diego, CA 92126

The reader should consult with experienced wheelchair athletes or coaches prior to making a final decision on which wheelchair is best for his/her use. Each wheelchair has its own advantages and disadvantages, and the quality of service and local availability of repair parts should be considered. Purchase of a sports-model wheelchair is a serious commitment. It's cost is approximately $1,000.

HEALTH AND SAFETY TIPS

Many athletes, including wheelchair athletes, find themselves so anxious to practice and compete that they overlook necessary health and safety precautions. Failing to observe common sense precautions results at least in loss of future practice time due to illness or injury. At worst, such oversights may result in permanent injury or death. Health and safety precautions should not be taken lightly, including the following:

- Drink ample water during all practices and games. This precaution applies to all athletes, but is especially critical for spinal cord injured athletes.

- Double amputees, high level spinal cord injured individuals, and athletes with limited sitting balance should keep their anti-tip (safety) casters in place during all practices and games.

- All players should use their anti-tip (safety) casters when participating in drills which increase the possibility of the wheelchair tipping over to the rear.

- If the wheelchair has brakes attached, these should either be removed or placed in a position to avoid interference with the athlete's hands when pushing forward on the wheels or handrims.

- Spinal cord injured players should be alert to the potential for skin breakdown (pressure sores, decubitus ulcers). Loose clothing, cleanliness and frequent checks for redness are essential. In addition, cushions should be used at all times. The player should lift the buttocks off of the cushion at regular intervals.

- Players should wear hard shoes which fit properly. This is especially true for players with little or no feeling in their lower extremities because (a) poor fitting shoes may cause pressure sores (see above), and (b) the use of hard shoes will help protect all players from injury to the feet caused by contact with another player's wheelchair.

Learning to fall properly from the wheelchair may prevent serious injury to a player. Helpful tips include:

- When falling forward, the player should attempt to fall a sufficient distance in front of the wheelchair to prevent entanglement. This maneuver will also help to elongate the player's body, thus lessening the risk of leg injury caused by the weight of the upper body landing upon the legs. Extending the arms to "cushion" the fall will also reduce the risk of leg injury.

- When falling to the side, it may be best to tuck the arms close to the chest and turn so that the upper back and shoulder areas absorb the impact. This maneuver prevents injury to wrists or shoulders, but should be used only if the fall is unlikely to cause leg injury.

- Falls to the rear are safest when the player quickly leans forward into a tuck position and grasps the frame of the wheelchair. This maneuver allows the back of the wheelchair to abosrb most of the impact. If the wheelchair has a low back without hand grips, however, the player may need to turn and "cushion" the fall with an extended arm.

- Regardless of the direction of a fall, the player must be careful to avoid head injury. This is done best by quickly tucking the head tightly to the chest or shoulder (inclined away from the area of impact).

Should any illness or injury occur, the player should obtain necessary medical attention immediately.

GENERAL CONDITIONING

During the latter part of a close basketball game, it is usually the best conditioned athletes who excel. Wheelchair basketball players and coaches must be aware of this important aspect of the game, and they should make every effort to maintain high levels of physical fitness. This involves, at the minimum, observing the following guidelines:

- Conditioning is a year-round process, so players should be sure to maintain fitness levels during the off-season.

- Off-season exercises and drills should stress conditioning in such areas as strength (S), cardiovascular endurance (CE), muscular endurance (ME), balance (B), and flexibility (F).

- Exercise and drills during the season may emphasize one area over the others, depending on the needs of the player. For example, muscular endurance may be stressed because it is a critical factor in wheelchair basketball. Arm fatigue not only limits mobility but seriously hampers shooting and ball-handling effectiveness.

. Each wheelchair basketball drill should be analyzed to determine its contribution to general conditioning. A rapidly paced fast break drill, for example, might increase strength, cardiovasular endurance and muscular endurance, while improving a player's fast-break abilities.

. In addition to basketball drills, the following are excellent for general condition. Those marked with an asterisk (*) are appropriate for use during in-season basketball practices: hill pushing (S, ME); cross-country (or road) wheeling (S, CE, ME); repeated forward springs (ME)*; repeated backward springs (ME, B)* (anti-tip casters may be helpful); supervised weight-training (S, ME, F); stretching and leaning exercises (B, F)*.

WHEELCHAIR HANDLING SKILLS

In the middle and late 1960s the University of Illinois' Gizz Kids was one of the finest wheelchair basketball teams in the country. A study, conducted with the players on one of these outstanding Illinois teams, revealed what most experienced players and coaches knew intuitively -- wheelchair handling skill seemed to be the most important factor in wheelchair basketball![1] As a result, it is essential that all players master and continue to improve on wheelchair handling fundamentals. Critical skills and tips include:

. Straight forward rushing -- critical for all "transition" situations, particularly the fast break on offense.

1. At the start, lean as far forward as is comfortable (or balance permits), keeping the head up. Players who cannot lean forward due to balance difficulties may wish to lower their seating height to increase their pushing power.

2. Grab each wheel and/or handrim (personal preference) slightly behind its apex (highest point).

3. Push forcefully forward and down, flipping wrists forward at the bottom of the push.

4. Rapidly return hands to each wheel's apex upon completion of each push; then repeat the forward push.

5. While moving, strive to maintain the same body angle with every push. Keep a stable platform -- avoid rocking of the body.

. Backward pushing -- important in many defensive situations, particularly when defending against a fast break.

1. At the start, lean and reach as far forward and down on each wheel as is comfortable (or balance permits), while keeping the head up.

2. Grab each wheel and/or handrim and pull upward and back.

3. In pulling back, the body will become more erect. Avoid leaning too rapidly or forcefully backward -- you may overturn backwards.

4. Rapidly return hands forward and downward to the middle/forward portion of the wheels/handrims; repeat rearward pull.

- Stopping -- particularly valuable in avoiding contact with opponents (fouls), or for safety when walls, bleachers, etc. are located close to side or endlines.

  1. Keep shoulders erect while applying uniform pressure with the hands to each wheel and/or handrim.

  2. If stopping suddenly, pull the head upward to assure proper shoulder alignment.

  3. If balance is a problem, lean backward sufficiently to avoid falling forward when stopping (particularly during rapid stops). If the wheelchair is moving backward, the player should lean forward when executing a sudden stop. This prevents tipping over rearward.

- Turning and pivoting -- probably the most critical skills of all because wheelchairs do not move laterally. Lateral movement is one of the most important skills in able-bodied basketball, so wheelchair players must compensate by turning or pivoting rapidly in order to gain or maintain proper position on the court. These skills are essential for both offensive and defensive play.

  1. While stationary or moving slowly, turns and pivots may be executed by grabbing both wheels simultaneously (the hand in the direction of the turn is to the front of the wheel's apex; the other hand is behind the opposite wheel's apex). Both arms should be as straight as possible. Pulling forcefully with the forward hand, while simultaneously pushing forcefully with the other. Leaning as far forward as is comfortable (or balance permits) as force is applied to the wheels. Once the desired angle of turn or pivot is achieved, execute a stop, or push off in the appropriate direction by simultaneously exerting force on both wheels.

Note: If only one hand is available for turning, i.e., while the player controls the ball with the other hand, the first two steps above may be executed by grabbing one wheel well in front of its apex and forcefully pulling to the rear, while the player shifts his/her weight backward and toward the direction of the turn. While moving forward, turns and pivots may be executed by:

- grabbing or applying pressure to one wheel at or slightly behind its apex (the wheel on the same side as the desired turning direction is grabbed);

- pushing on the opposite wheel to increase turning speed (this will not be necessary if moving at a rapid pace);

- while grabbing and pushing, shift body weight by leaning as close as possible to the side of the wheelchair with the grabbing hand (this places the player's center of gravity closer to the turning base, thus increasing traction and speeding the turn);

- once the desired angle of turn or pivot is achieved, execute a stop, or push off in the appropriate direction by exerting force on both wheels simultaneously.

While moving backward, turns and pivots are executed by:

- grabbing one wheel at or slightly in front of its apex (as above, grab wheel on the side of the desired turning direction);

- pulling repeatedly on the opposite wheel to increase turning speed, if necessary;

- while grabbing and pulling, shift the body weight as described above;

- once the desired angle of turn or pivot is achieved, execute a stop, or push off in the appropriate direction by simultaneously exerting force on both wheels.

Prior to completing the section on wheelchair handling skills, it is important to note that players with high spinal cord injuries, or similar disabilities, may have difficulty leaning in the wheelchair due to poor balance. In general, such players should hold onto solid portions of the wheelchair for support while leaning, i.e., the back-posts, seat-rails, or side-arms (depending upon the direction of the lean and comfort of the player).

WHEELCHAIR HANDLING DRILLS

Any number of drills may be used in practice sessions to maintain or improve wheelchair handling skills. Drills should be primarily selected for their efficiency and effectiveness in the practice of specific skills, but their potential for increasing a player's conditioning level should also be taken into consideration. The following are sample drills designed to offer practice in wheelchair handling skills. During practice sessions it is sometimes advisable to have players of approximately equal ability participate in the drills side-by-side, thus stimulating friendly competition. Such "coaction" has been shown by research to improve performance efforts.

- Towing Drill. Two players are needed to execute this drill. It gives practice in straight forward pushing and stopping, while increasing strength and muscular endurance.

  1. The lead player takes a position on the endline, facing the length of the court.

  2. The trail player takes a position immediately behind his/her partner and grasps each backpost of the partner's wheelchair.

3. The lead player then pushes as rapidly down court as possible, with his/her partner in tow.

4. After wheeling the length of the court, the lead player stops at the opposite endline.

5. The players then change positions, and return as rapidly as possible.

. Backward Drill. Learning to control the wheelchair while moving backward is necessary because this technique is often used in proper defensive play. For safety, be sure the anti-tip casters are down prior to beginning this drill.

1. The player positions the wheelchair on the endline so that the court is to his/her back.

2. The chair is pushed backward at an even pace to the closest free throw line (or extension of a free throw line), where the player executes a stop.

3. As soon as the wheelchair is stationary, the player again pushes backward across the midcourt area to the far free throw line. This time the player should start off slowly and gain as much speed as possible (while maintaining a straight path).

4. At the free throw line, the player again stops the wheelchair.

5. As soon as the wheelchair is stationary, the player pushes backward at an even pace until crossing the endline.

. Suicide Drill.(See Diagram 1.) This drill provides practice in straight forward pushing and turning while moving. It is an excellent drill for increasing speed in each of these drills, and also helps to improve muscular endurance.

1. Five traffic cones (or folding chairs) are placed in a row, spaced so that one is on each endline, each free throw line (or free throw line extended), and at the midcourt line.

2. The player starts at one endline, on either side of the cone, and sprints forward toward the cone at the nearest free throw line.

3. At this cone, the player executes a turn around the cone (#1, Diagram 1) and sprints back toward the baseline cone. All turns should be executed as rapidly and as close to the cones as possible.

4. At the baseline cone, the player executes a turn around the cone and, without stopping, sprints back upcourt toward the cone at the midcourt line.

5. At the midcourt cone, the player again turns around the cone (#2, Diagram 1) and sprints back to the baseline cone.

6. This process is repeated, as rapidly as possible and without stopping, until the cone at the far free throw line and the cone at the far baseline have been circled (#3 and #4, Diagram 1). After each cone is circled the player must return to the starting point.

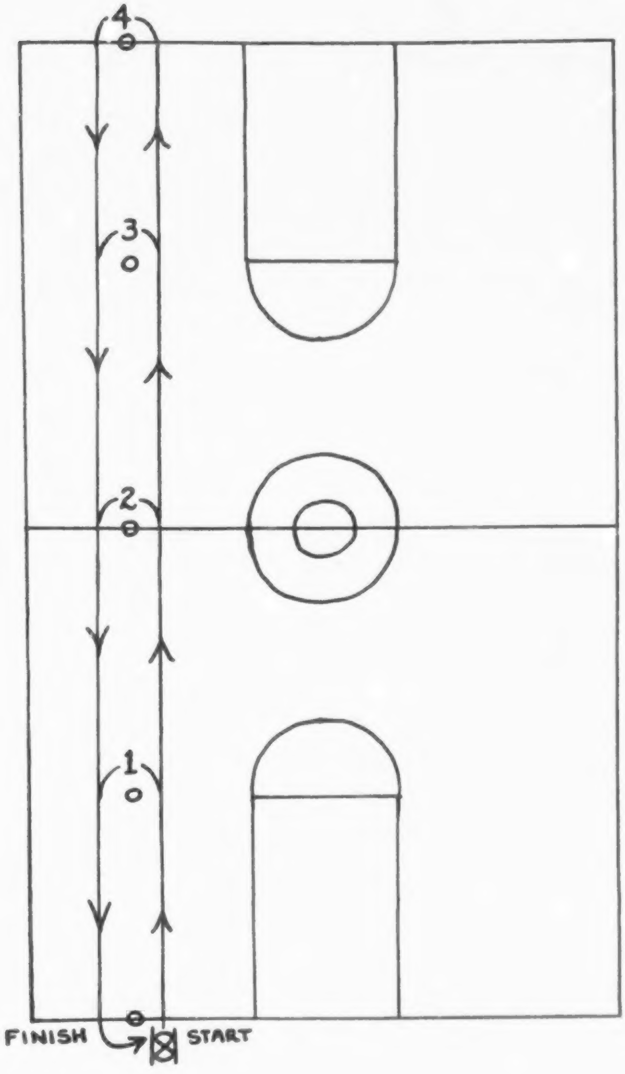


Diagram 1. Suicide Drill.

. Wheelchair-Weave Drill (Diagram 2). The weave drill primarily attempts to sharpen a player's turning skills, while aiding muscular endurance.

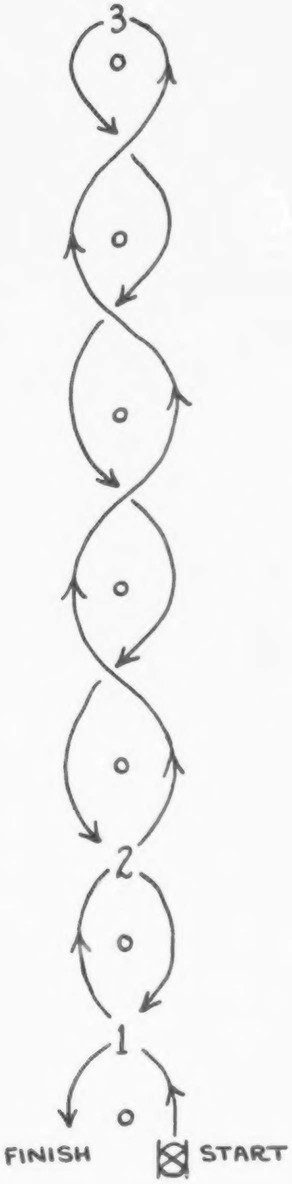


Diagram 2. Wheelchair-weave drill.

1. Seven traffic cones (or folding chairs) are placed in a straight line, evenly spaced approximately 10 feet apart.

2. The player begins on one side of an end cone and passes between this cone and the next cone (#1, Figure 1).

3. Beside this second cone, the player executes a turn and changes direction so that he/she passes between this second cone and the third (#2, Diagram 2).

4. This process is repeated to the end of the cone line, where the player executes a turn around the last cone (#3, Figure 1) and weaves back through all of the cones.

5. As with the Suicide Drill, all turns should be executed as rapidly and as close to the cones as possible. This drill and many of the drills included here, lend themselves to racing against a stopwatch. By occasionally timing these drills, the player can easily measure the wheelchair handling progress that results from regular practice.

. Spin (or Pivot) Drill. Because the spin, or pivot, is a vital skill for most offensive and defensive maneuvers, this probably is the most important individual drill. It should be incorporated into each practice session because it offers a chance to practice each individual wheelchair handling skill. Beginners should concentrate on technique at first, with speed emphasized once proper techniques have been mastered. Be sure anti-tip casters are lowered prior to performing this drill.

1. The player starts at one endline and sprints forward to the nearest free throw line (or free throw line extended).

2. At the free throw line the player stops the wheelchair as rapidly as possible, and then, from a stationary position, executes a complete (360°) spin (see SKILLS - "turning and pivoting").

3. Once the player is again facing upcourt (in the original direction), he/she pushes off with both hands and sprints to the midcourt line.

4. At the midcourt line the player stops the wheelchair, then pushes the wheelchair backward until even with the top of the foul line restraining circle (this is the same area the player has just passed while executing the preceding step).

5. Once the player is even with the top of the foul line restraining circle, a complete (360°) spin is executed without stopping (see SKILLS - "turning and pivoting - moving backward").

6. When the player is again facing upcourt (original direction), he/she pushes off with both hands and sprints across the midcourt area to the opposite free throw line (or free throw line extended).

7. At the free throw line the player, without stopping, executes a complete (360°) spin (see SKILLS - "turning and pivoting - moving forward").

8. Once the player is again facing upcourt (original direction), he/she pushes off with both hands and completes the drill by sprinting across the endline and executing a stop.

9. In summary, the sequence skills used in the drill is start, sprint forward, stop, spin, sprint forward, stop, sprint backward, spin, sprint forward, spin, sprint forward, and stop.

. One on One Drill. Competition is an excellent motivator. This simple drill is useful because it has two players competing in wheelchair handling skill.

1. The two players position themselves near one endline, with player "A" facing the opposite endline.

2. Player "B" faces his/her partner ("A"), stationed about 6 feet away.

3. Player "B" gets by and crosses the endline (or a given amount of time expires).

4. The players switch positions and repeat the drill.

BALL HANDLING SKILLS

Proper handling of the wheelchair is the premier skill in wheelchair basketball, but chair handling alone is not enough. A player must also be accomplished at handling the ball. This is especially difficult in wheelchair basketball because the hands and arms are used both for ball handling and player mobility. Some chair handling skills may even need to be modified slightly so they can be executed while maintaining control of the ball (stationary turns and pivots, for example). Good wheelchair basketball players have mastered both wheelchair handling skills and ball handling skills; outstanding wheelchair basketball players can effortlessly perform both tasks simultaneously.

. Picking Up Loose Ball. Loose balls occur frequently in wheelchair basketball, and securing the ball once it is on the floor sometimes is difficult for novice players, particularly those with poor balance. The most efficient way to pick up a loose ball on the floor (stationary or rolling) is to:

1. Position the wheelchair so that it is moving forward, and so that the ball is ahead and slightly to either side of the wheelchair.

2. As the wheelchair rolls into position beside the ball, the player leans to the side toward the ball. If comfortable, the player may aid balance by holding onto the wheelchair (arm or seat frame) with the hand away from the ball.

3. Using the hand closest to the ball, the player presses the ball forcefully against the hand rim and spokes of the large wheel. Since the wheel is in motion, this action results in the ball accompanying the wheel in its upward arc.

4. Maintain pressure against the ball until it approaches the apex of the wheel.

5. As the wheel nears the apex, rotate the hand to the underside of the ball while simultaneously pulling the hand (and ball, of course) away from the wheel.

. Dribbling. The rules of wheelchair basketball allow a player to place the ball in his/her lap while pushing twice on the wheels. This maneuver is acceptable when the player is not closely guarded, but is not recommended when a defensive player is nearby. Therefore, dribbling while pushing the wheelchair is an extremely important skill for wheelchair basketball players to master. Dribbling, as with most of the ball handling skills used in wheelchair play, requires techniques basically similar to those in able-bodied basketball. It is not necessary, therefore, to describe the conventional dribble in detail. Unique points regarding wheelchair basketball dribbling include:

1. Wheelchair basketball players generally dribble the ball to the side of the wheelchair because dribbling to the front requires exceptional balance and risks interference from the foot platforms.

2. To accelerate the wheelchair while dribbling, an effective technique is to: push the ball forcefully to the floor at a forward angle; take two rapid pushes on the wheels. Provided the angle of the initial dribble is correct, the ball should be located in the proper dribbling position at the conclusion of the two pushes.

   By repeating this maneuver, the player may steadily increase speed while maintaining possession of the ball (without placing it in his/her lap). As wheelchair speed increases, the angle of ball release must also increase to assure its return to the proper dribbling position.

3. The dribble should be executed on the side of the wheelchair away from the nearest defender, thus using the wheelchair as a "shield" for the ball. Ability to dribble effectively with either hand, therefore, is essential.

4. There is no double-dribble rule in wheelchair basketball, so grasping or holding the ball does not prevent subsequent dribbles. This makes changing sides of the dribble a relatively simple task since no "cross-over" dribble is required. The player must be careful, however, to allow the ball to strike the floor prior to beginning a third consecutive push on one or both wheels. Taking a third consecutive push is a traveling violation.

5. Players who have balance difficulties when dribbling should try sliding their hips and buttocks forward slightly on the cushion and leaning back against the wheelchair's back support.

6. When no defensive players are nearby, an effecitve fast break maneuver is to toss the ball (with slight backspin) well in front of the wheelchair.

The player may then push at full speed to regain the ball. One word of caution, however: after the toss, the ball's initial impact with the floor must occur before the player takes a third consecutive push.

. Dribble and Spin (180°). This maneuver may be difficult to master at first, but it is the most valuable move in wheelchair basketball. By learning it, the player is able to quickly reverse direction while not only protecting the ball but keeping it in position for dribbling or passing. It is used generally when a defensive player is positioned beside the dribbler. To execute the dribble and spin, the player should:

1. Push the ball forcefully to the floor with one hand. This should be done at a right (90°) angle to the floor so that the ball returns straight up to shoulder level.

2. Spin (180°) the wheelchair rapidly using both hands (see "Wheelchair Handling SKILLS - turning and pivoting"). This spin should be executed so that foot platforms turn (arc) toward the ball.

3. If executed correctly, the spin should conclude with the ball at the proper height to be secured by the opposite hand in a position for dribbling or passing.

. Pivot, Drive, and Dribble. This maneuver is most effective when a defender is positioned to the rear of the offensive player. It is begun with the ball in the player's lap, so it is important that no defenders are in a position to reach the ball. To perform the pivot, drive, and dribble, the player:

1. Performs a pivot using both hands simultaneously, i.e., to pivot left the player pulls backward on the left wheel while pushing forward on the right.

2. As soon as the wheelchair is at the desired angle, the player pushes forward forcefully using both hands. This initiates the drive phase of the maneuver. At this point, the player must now dribble, pass, or shoot, since a third consecutive push is a traveling violation.

3. Immediately after taking the first push of the drive phase, the player uses the inside hand (the one used to pull rearward during the pivot) to push the ball off of his/her lap. This is done so that the ball comes off of the lap to the side away from the pushing hand; thus it remains protected on the side of the wheelchair away from the defender.

4. As the ball comes off of the lap and clears the wheel, the player uses the outside hand (the one used to push forward during the pivot) to tap the ball downward and forward to the floor. This tap should propel the ball in the direction the player plans to drive and at a forward angle to allow two pushes prior to retrieving the ball.

5. Two rapid and forceful pushes are now taken to accelerate the wheelchair as the player continues the drive. The player must be careful, however,

not to begin the first of those two pushes until after the ball strikes the floor (see preceding step).

6. Once the ball is retrieved (following the two pushes), the player may continue the drive by picking up the dribble, or, if no defenders are within reach, by placing the ball in his/her lap.

- Cross-body Pivot. The previous maneuver (Pivot, Drive, and Dribble) is not always possible to perform, especially when guarded from the side. To execute a pivot while closely guarded, some players prefer to use a cross-body pivot. To accomplish this:

1. While the wheelchair is moving, the player maintains control of the ball with the hand away from the defender.

2. Next, the player reaches across his/her body with the opposite hand and applies pressure to (or grabs) the wheel on the side away from the defender.

3. This braking action on the side away from the defender, plus shifting the body weight by leaning as close as possible to that side, results in a pivot away from the defender.

4. As the wheelchair pivots, the player should be momentarily open to execute a pass or shot, or he/she may choose to resume dribbling.

5. One word of caution is needed. As the pivot takes place, the hand with the ball will initially move away from the defender. Because this hand will end up on the side of the wheelchair nearest the defender, the player must be careful to protect the ball, and any subsequent dribbles should be made to the side away from the defender.

- Passing. Properly executed passing is the key to any successful offense in able-bodied basketball, and it is just as important in wheelchair play. The types of passes used during play are identical for both wheelchair and able-bodied basketball, and the techniques for executing them are basically identical. When passing, the wheelchair basketball player should remember:

1. The best location for receiving a pass is from slightly above the waist to shoulder height, and players with balance difficulties usually find chest high passes easiest to receive. The passer should be aware of the preferences and pass-receiving abilities of teammates.

2. Some passes that are effective in able-bodied play are less frequently used in wheelchair basketball, and vice versa. Common wheelchair basketball passes include:

    a. Two hand push (chest) pass - very frequently used. It is effective up to 15 feet and best employed when not closely guarded.

    b. One hand push pass - commonly used to pass at an angle to the wheelchair. It is very effective when the player is closely guarded from one side.

c. Two hand overhead pass - this pass is effective because a defender must remain firmly seated in the wheelchair. It is excellent for passing over a taller opponent who is defending from the front.

d. Lob pass - although dangerous, this pass is very effective when aimed at a teammate who enjoys a height advantage over his/her defender. It may also be used as a lead pass to a fast-breaking teammate.

e. Bounce pass - not as effective in wheelchair play because the defender is better able to deflect or intercept the pass (his/her arms are closer to the floor than players who are standing). Also, it is difficult to receive a low bounce pass, especially for players with limited balance.

f. Baseball pass - holding on to the wheelchair frame (or arms) with the non-throwing hand aids execution of this pass. It is used primarily as a lead pass on a fast break and, unfortunately, it is often thrown away due to poor technique or over-anxiousness on the part of the passer. The key to a successful baseball pass is to put adequate backspin on the ball.

g. The hook pass, shovel pass, hand-off pass, and tip pass also are useful in certain offensive situations. However, the behind-the-back pass has little usefulness in wheelchair basketball except, perhaps, to impress spectators.

3. All lead passes should be thrown with the proper amount of backspin on the ball. Thus, a teammate may be able to catch up with the ball after it bounces. This is especially critical in wheelchair play because the player is not able to "save" an overthrow by jumping into the air.

4. If properly used, the wheelchair may provide a natural "shield" to keep a defender away from the pass. The position of the defender, plus the direction of the passer's wheelchair, may dictate which of the above passes to use. In general, it is best to pass the ball in the direction the wheelchair is facing.

. Receiving a Pass. This skill is consistent with able-bodied techniques, but there are several points that wheelchair basketball players should note. These include:

1. Receiving a high pass is difficult for all wheelchair basketball players.

a. Those with balance problems must be careful to avoid falling, so it is advisable to maintain balance (and extend the reach) by grabbing the wheelchair arm or frame with the opposite hand. Obviously, this requires a one-hand reception which needs to be practiced.

b. Players without balance difficulties must be cautious not to lift their buttocks off of the seat or cushion while reaching for the ball. Extremely high passes may require the use of the technique described above.

2. Low passes may require the receiver to deflect the ball to the floor. By controlling this deflection, thus keeping the ball within reach, the player may either dribble or secure control. As with high passes, this method for bringing low passes under control requires practice. To execute this maneuver:

   a. Reach one hand toward the incoming pass and, if necessary, use the opposite hand to provide balance by grasping the wheelchair arm or frame.

   b. Cock the wrist of the extended arm back at an angle (the forearm and wrist should form an angle of approximately 150°).

   c. Keeping the hand extended beyond the wheelchair, deflect the ball downward. If the ball is contacted with the proper hand angle, it should deflect to the floor so that it bounces straight up.

   d. As soon as the deflection is made, the player should quickly withdraw the extended arm to allow the ball to rebound freely from the floor. It may bounce rather high, but allowing the deflecting arm to "give" slightly will aid bringing the ball under control.

   e. Once the ball has rebounded from the floor, begin to dribble or, if the situation dictates, secure control of the ball.

3. Low passes to the front of the wheelchair often result in turnovers by deflecting off of the players' foot platforms. The player may avoid this situation by pivoting quickly, thus rotating the foot platform away from the low pass. Once the foot platforms are out of the way, it is easier to execute the technique described above. This maneuver is critical for players with balance problems who are unable to control the pass by leaning forward.

. Shooting. The arm and hand movements associated with shooting techniques generally are identical to those used in able-bodied basketball. More strength is required to shoot accurately while seated in a wheelchair, however, and some players prefer to use two hands when taking shots from distances greater than 10 feet. The following points should be considered when shooting:

1. The best position for shooting is sitting upright in the wheelchair, with the chair directly facing the basket. Keeping the wheelchair pointed toward the basket often results in the foot platforms acting as a "shield" between the shooter and the defender. The added distance between players, resulting from the foot platforms, may prevent the defender from blocking the shot from the front.

2. Players lacking the muscular development (or function) to shoot either a one- or two-hand push shot, may resort to a two-hand overhead shot. This shot, not usually seen in able-bodied play is executed while leaning rearward in the wheelchair and may give the player added shooting "range." The player should be cautioned, however, that this shot is easily blocked

from the rear. It should be taken only when defenders are located in front or beside the shooter.

3. Most players find it difficult to shoot accurately from more than 12-15 feet from the basket. It is important, therefore, for the players to spend practice time on shots from within 15 feet of the basket, and to become disciplined in avoiding taking longer shots in game situations.

4. Taller players should work on shooting with the arms fully extended overhead. Such shooting requires strong wrist action, but is well worth the effort since the player is able to rebound and then shoot without bringing the ball down. Thus, the ball stays out of the reach of shorter defenders.

BALL HANDLING DRILLS

Most drills used by able-bodied teams are appropriate for use in developing wheelchair basketball skills. The primary purpose of ball handling drills is to practice specific techniques involving the ball, but drills which include conditioning and wheelchair handling aspects also allow the player to improve in several vital phases at one time. The number of drills for improving individual ball handling skills is almost endless. The following are only a few of the drills that have been found to be especially useful for wheelchair basketball players:

. Weave and Dribble Drill. This drill allows the player to combine dribbling and chair handling skills. The procedure is exactly the same as the wheelchair-weave drill described earlier (Diagram 2), except the player is required to dribble while weaving. One variation of this drill is to replace the traffic cones with players. These stationary players act as defenders and attempt to steal or deflect the ball as the dribbler goes by. Thus, the dribbler learns to protect the ball at all times.

. Dribble and Spin Drill. This drill is similar to the Spin (or Pivot) Drill outlined earlier, but the backward push is eliminated from the drill. Incorporating ball handling skills into this drill enables the player to get used to starts, stops, and spins while controlling the ball. To add interest, and also get shooting practice, the final sprint can be made toward the basket where the drill ends with a successful lay-up.

. Loose Ball Drill. The value of this drill is that the target skill can be practiced repeatedly while the player also improves balance and conditioning.

1. The player starts at the endline, with the ball placed on the floor at the free throw line (or free throw line extended).

2. The player then sprints to the ball and, without stopping, picks up the loose ball as described in Ball Handling Skills.

3. As soon as the player secures the ball and returns to an upright position, he/she rolls the ball slightly ahead and sprints to the ball again.

4. As the ball rolls, the player again secures control and repeats the process described above.

5. The player repeats rolling and retrieving the ball until crossing the opposite endline (or the drill may conclude with a successful lay-up).

. Baseball Pass Drill. Two players are needed to perform this drill and it provides practice for both the passer and the receiver.

1. The passer is positioned under one basket and the receiver is located on the near free throw line.

2. The passer simulates a rebound, yells "Ball," and the receiver immediately sprints toward the opposite basket.

3. The passer throws a baseball pass, being sure to put plenty of backspin on the ball. The ball is thrown so that it lands ahead of the receiver who sprints to catch up to it.

4. If executed properly, the receiver should overtake the ball prior to the opposite free throw line, secure control, and make a successful lay-up to conclude the drill.

5. After releasing the pass, the passer sprints upcourt and trails the receiver to the basket. By so doing, the passer is in position to rebound a missed lay-up.

6. A variation of this drill has two receivers sprint to the ball. The first one to the ball attempts to drive for a lay-up while the other player becomes a defender and attempts to prevent a successful shot.

. Progressive Passing Drill. This ideal drill offers a chance to practice several skills (or phases of play) within the context of one drill. It enables two players to practice passes which are appropriate at various distances.

1. Two players face each other at midcourt, one on each side of the midcourt line.

2. One player passes to the other as they simultaneously begin wheeling slowly backward, away from each other.

3. As the distance between the players increases, they vary the type of pass (using any pass which is appropriate for the distance between them).

4. Once the players reach the endlines (or a distance where accuracy decreases), they reverse direction and push slowly toward each other.

5. As they approach each other, the players continue to execute a variety of passes until they meet at midcourt.

. Spot Shooting Drill (Diagram 3). Certain spots on the floor seem to be more popular shooting locations than others, particularly if a team uses a "pattern" offense. After selecting spots based on the teams shot chart from previous games, the player can use this drill to increase shooting accuracy. Diagram 3 provides a sample diagram showing shooting locations.

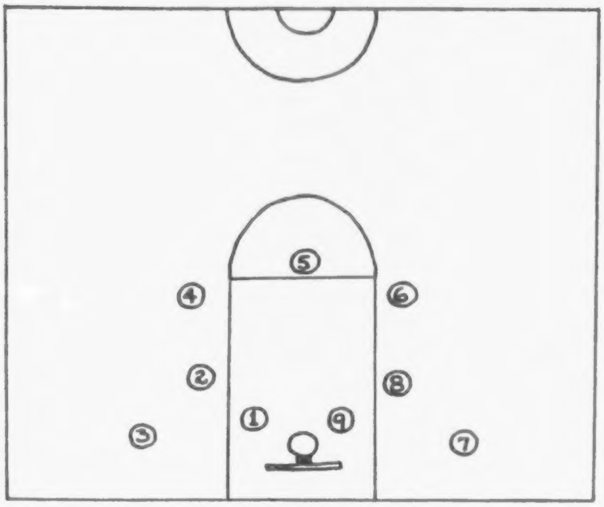


Diagram 3. Spot shooting drill.

1. The player begins at location #1 and takes one shot at the basket.
2. After retreiving the ball, whether or not the attempt was successful, the player executes a lay-up and moves to location #2.
3. Following each attempt, the player executes a lay-up and moves to the next location until all shooting locations have been completed.
4. Although this is a simple drill, there are a number of variations possible which add interest by introducing an element of competition.
   a. Point values may be assigned to each location based on the distance (or difficulty) of the shot. Thus, the player may compete with others or compare the total score with his/her own previous best effort.
   b. Speed may be introduced by competing against the clock. In this variation, the player may not advance to the next location until a shot is made. Thus, both shooting accuracy and speed in retrieving the ball are important. Once an attempt is successful from the final location, the elapsed time for all locations is noted.

c. Two players can race each other, just as one player raced against the clock. To compete, one player starts at the first location and continues clockwise until shots have been made at all locations. The other player begins at the last location and proceeds counter-clockwise until finished. The first player to make shots at all locations is the winner.

RESOURCES

National Wheelchair Basketball Association (Dr. Stan Labanowich, Commissioner), 110 Seaton Bldg., Univ. of Kentucky, KY 40506. Information on starting a team, plus a directory of current teams, is available through the NWBA. Periodic statistic sheets and newsletters are distributed to member teams.

NWBA Rules Committee (Ralph W. Smith, Chairman), Dept. of Recreation, Univ. of Maryland, College Park, MD 20742. Requests for current rulesbooks ($2 each) plus interpretations of these rules will be honored.

Owen, Ed. Playing and Coaching Wheelchair Basketball. Urbana, IL: University of Illinois Press, 1982. This illustrated text is over 300 pages in length, including 200 series of pictures and 100 diagrams. ISBN 0-252-00867-7.

Shaver, Lew. Wheelchair Basketball: Concepts & Techniques 1981 copies are available from Mr. Lew Shaver, CA 122, Southwest State Univ., Marshall, MN 56258. ($8.00.)

Sports 'N Spokes Magazine, 6043 N. Ninth Ave., Phoenix AZ 85013. This journal provides information and articles on a variety of sports for physically disabled people, including wheelchair basketball articles and rankings.

Labanowich, Dr. Stan. "Wheelchair Basketball: A History of the National Association and an Analysis of the Structure and Organization of Teams." Unpublished dissertation, University Microfilms, 1975. 300 N. Zeeb Road, Ann Arbor, MI 48106. Publication number: 75-24-347.

Section II

Practical Pointers for Individual/Dual Sports

PRACTICAL POINTERS

BOWLING FOR INDIVIDUALS WITH DISABILITIES

Young American Bowling Alliance

There is a social movement in sport, recreation, and physical education to develop methods and techniques enabling individuals with disabilities to participate in common sports and leisure activities. Bowling is a sport very well suited to individuals with disabilities. Because it is an individual sport and bowlers can control the pace of activity, bowling can be adapted to most everyone's needs and abilities.

In working with individuals with disabilities it is important to adapt sport to individuals rather than force persons to adapt to sports. The goal of bowling is to knock down pins. Use of special devices or rule adaptations contributing to this goal are justifiable and encouraged.

Bowling can be modified in a number of ways. Some of these include: using light weight balls, shortened lane, and allowing three balls per frame. Use your own best judgment in modifying bowling to fit individuals. The goal is to have every bowler feel successful while preserving the major objective of the sport, to knock down pins.

For the most part, skills taught to special bowlers are the same as those for other bowlers. Prior to instruction on how to bowl, a preliminary evaluation should be made to determine the relative skill level and capabilities of the individual. It may not be best to select only one approach to instruction. Some individuals may be able to work toward developing a four-step delivery. Others may need to begin at the foul line, rolling the ball with two hands. Each person should begin at a level where he or she can experience some success. The use of different deliveries (e.g., two hands, one-step, two step, four step) should not cause embarrassment

Bowling for Persons with Visual Impairment

It is very difficult, if not impossible, for blind persons to visualize angles. Therefore, an aiming system whereby all shots will be in a straight line should be developed. The following systems successfully accomplish this:

Bowling with the Rail

- STRIKE BALL. Hook the elbow of the guiding arm over the rail. Adjust the rail position so the ball is lined up with the center of the lane when hanging at the side of the bowler in the delivery hand. The rail will now remain in this position for all succeeding shots.

- LEFT-SIDE SPARES. For the 4, 7, and 8 pins hook rail under the armpit of the guiding arm. This will line the delivery arm up with the guiding arm and will line the delivery arm up with the above pins.

- RIGHT-SIDE SPARES. For the 6, 9, and 10 pins hold rail in the hand of the guiding arm with the arm extended straight out to the side, parallel to the floor. This will line up the delivery arm with the above pins.

- CENTER SPARES. Return to the STRIKE POSITION. This will cover the 1, 2, 3, and 5 pins.

Bowling Without the Rail

Many bowlers who are blind prefer to bowl without a rail. They utilize the ball return as a starting position from which to adjust. This is accomplished by resting the leg against the side of the ball return and then side stepping to gain the proper position for various shots. Since the ball return is between the two lanes used in a match, this will mean using the left leg on the right lane and the right leg on the left lane. It is necessary to develop a uniform side step. The moves in this method are usually as follows:

- RIGHT LANE. Rest left leg against the ball return. Strike ball and/or center spares, two side steps to the right. Right-side spares, three side steps to the right. Left-side spares, one side step to the right.

- LEFT LANE. Right leg will rest against the ball return. The strike ball or center spare move will remain the same, two side steps to the left. Left-hand spares, three side steps to the left. Right-hand spares, one side step to the left.

Assistance must be given the bowler in establishing the proper length of side step. After this, the only assistance necessary is to guide them to the lane and call out the pins standing. Some develop a keen sense of hearing which can tell them approximately how many pins have been knocked down.

Some roll a hook ball creating an almost impossible problem in picking up the 6 or 10 pins. Try to have them develop a straight ball with the thumb of the bowling hand at about 12 o'clock at the time of delivery. Another suggestion is to flatten the palm. Many hook and curve ball bowlers do this to convert spares on the ball side of the lane.

When teaching beginners, it is advisable to have them stand at the foul line in the proper position and deliver the ball with just a pendulum swing and no steps. This later can be developed into one, two, or three steps for an approach. The shorter the length of the step, the easier it is to maintain a straight line. In the beginning, rolling the ball smoothly and slowly is of the utmost importance. As soon as the ball is rolled too hard, the person has a tendency to pull the arm across the body and angle the ball. This makes it difficult to develop consistency and accuracy.

Bowlers who are partially sighted should stand about two feet back of the foul line and roll over the center dot for the strike ball and center spares. Position the delivery arm in line with the center or "big" dot on the floor at the foul line. Align shoulders square to the foul line dot target. Then roll the ball over that dot. Use the dot to the right of center for the 3-6 combination or the 6-9. Move to the 2nd dot to the right of center for the 6 or the 6-10 combination. Use the dot to the left of center for the 2-4 combination or the 8 pin, second dot to left of center for the 4 pin or the 4-7 combination.

In Halifax, Nova Scotia, there was a man observed with impaired vision who refused any help. He used a pair of field glasses to determine the pins that remained standing and then used the adjustment method explained above. His average was 130.

Another blind adult bowler made this comment. "I do have one advantage over sighted bowlers. I do not have to look at the mess I leave after the first ball."

Bowling for Persons with Physical Disability

Learning basic skills is very much an individual process for bowlers with physical disability. Each bowler needs to develop skills according to their own physical abilities. When bowlers are ambulatory, they can use many regular skills. When bowlers are not ambulatory they may be able to roll the ball while seated in a straight back chair or wheelchair. When this is not possible, bowling aids can be used freely to adapt the sport to the bowlers.

In addition to helping individuals with physical disability, particularly children, learn skills of bowling, it is also important to help them develop social interaction and emotional stability. Below are some hints that can be helpful in developing these skills.

- Individuals with physical disabilities have normal intelligence and are interested in many of the same things as other persons their age. Thus, it is important to interact with them (i.e., talk with them, tease them) in the same way as would be done with individuals in regular bowling programs.

- Set readily achievable goals at first so individuals do not become discouraged. As skills are gained, set more challenging goals.

- Individuals with physical disability to not usually excel in physical tasks. Frequent encouragement and positive feedback is needed.

- Individuals with physical disabilities can have good and bad days. This can be due to either or both the nature of disability and medical treatment required. When persons are uncomfortable or tired, adjust goals and expectations accordingly. Do not force adaptation to the activity of the day. Adapt to their situation or condition.

Bowling Using a Wheelchair

Basic skills of wheelchair bowling are very similar to traditional bowling, without the approach, of course. Centers can aid bowlers by furnishing ramps down into the bowling areas and up to approaches. A wheelchair with a wheel locking device is required.

Positioning

The chair should also be equipped with an extra seat cushion to raise the bowler up. When the forearm is resting on the chair arm that forearm should be parallel to the floor. A wedge cushion should also be used between the non-throwing side of the bowler and the side of the chair so the bowler does not slide when delivering the ball.

Approach and Delivery

Most bowlers, when able, prefer to get the ball from the return without assistance. They can then roll the chair to the foul line, positioning themselves where, when their bowling arm hangs over the side of the chair, it is aligned with their spot on the lanes, and setting the brake.

The bowling arm is rested on the arm of the wheelchair, palm up, ball in hand. The ball is pushed out to the front and side away from the wheel of the chair. Best results are gained by rotating the wrist 1/4 turn so the back of the hand is next to the wheel on the backswing and continues this hand position forward until the ball has passed bottom dead center For the remainder of the swing, the wrist is rotated until the thumb is at about 9 or 10 o'clock position (right-hand bowler). This will produce a hook but it is the easiest method to keep the ball from hitting the chair wheel. Spare shooting here, as for bowlers with visual impairment, can be limited to direct line shooting.

In some cases wheelchair bowlers are unable to handle the ball well in a wheelchair (particularly children). In such instances, a good method is to get a wooden, straight-back chair, attach a rubber covering to each leg and improvise a seat belt on the chair. Place the chair at the foul line, pick up or aid the bowler to the chair, and strap the seat belt across the bowler's lap. Chair should be low so by leaning a bit the bowler can lift the ball off the floor. The bowler then straightens up so the ball clears the floor and goes into a pendulum swing. An attendant must hold the back of the chair to prevent it from falling over during delivery. In most cases of league bowling, special exceptions as to the rules are requested so a bowler may roll three frames without moving since it is a major effort to get them strapped into the chair.

A great precedent was set in the Missouri AJBC Tournament in 1964 when there were about eight teams of physically disabled bowlers entered in the regular tournament. Not only was this a big emotional lift for them, but it was an eye-opening experience for the other bowlers.

Bowlers Using Canes

Those able to walk with canes can easily bowl. An attendant takes the ball to the foul line and sets it on the floor next to the bowler's foot. Bowlers form a tripod with the legs and one cane, reach down and pick up the ball. Attendants can remain with bowlers to hold a second cane if necessary or provide additional support as needed. The amount of mobility will determine whether any steps can be taken with the ball. If steps are not possible, the no-step delivery used by Bantam level bowlers will provide suitable skills.

Bowlers with Advanced Muscular Dystrophy

Some bowlers with extreme cases of muscular dystrophy have minimal strength and motor ability. They can be aided with a ball drop made of aluminum tubing similar to the ball drop machines. It is placed on the approach. Direction of aim is controlled by a small wheel on the side of the device. This wheel can be operated by a very little movement. The ball is placed atop the ball drop by an attendant. The bowler pulls a release string when the device is properly aimed and the ball rolls down the tubing towards the pins. The excitement this technique generates for bowlers is fantastic.

Another improvisation is a wooden or metal fixture that hooks over both arms of the wheelchair and slopes at about a thirty degree angle to the floor. The chair is placed sideways at the foul line and the fixture is then attached to both arms and sloped onto the lane bed. The bowler adjusts the chair to the best position, then pushes the ball from the flat area across the two chair arms, down the slope and toward the pins.

Bowling with the Feet

It is certainly possible to bowl with feet only. Individuals with double arm amputation do this very successfully. The ball is placed on the floor at the foul line resting on the thumb hole. The bowler removes the shoe and sock from the bowling foot. Then, using the toes and ball of the foot, the ball is aimed and propelled down the lane.

As with other bowling skills, watch the target. Push the ball forward with even force on the middle of the ball. This will prevent erratic spins. Follow through with the foot toward the target.

Bowling for Persons with Mental Disability

Individuals with mental impairments are a very diversified group in needs as well as abilities. As a result, it is difficult to make generalizations about which teaching techniques are most effective in helping them learn to bowl. However, some of the following hints can guide the actions of coaches and teachers.

- Do not underestimate abilities of retarded individuals to perform skillfully. Individuals with mental handicaps are often more successful with physical tasks than mental, social, and emotional skills. Often, goals are set too low, particularly for mildly retarded children from poor cultural backgrounds.

- Retarded children do not adapt as well to change as do normal children. Begin and end each session the same way. This will help them feel more comfortable in the bowling setting.
- Use demonstrations frequently. Seeing a skill performed correctly is often more helpful than hearing how to do it.
- Keep verbal instruction and lectures to a minimum. Use less verbal instruction as the degree of severity of retardation increases.
- Use manual guidance as a method of instruction, particularly with younger, more severely retarded children. As children decrease in their ability to communicate, the value of manual guidance as a teaching technique increases.
- Use strong visual and auditory stimuli for more severely retarded bowlers.
- Be patient with slow and small gains in skill with more severely retarded persons. Gains that may seem small compared to normal children can be tremendous gains for severely retarded persons.
- Be positive. Reinforce strengths and minimize weaknesses.

One of the primary problem areas for some individuals is approach because it is related to balance. It may be best to eliminate steps in the approach, or develop a fewer number of steps that can be mastered. It is more practical to take fewer steps and develop uniformity than try to conform to the popular three, four, or five step approach concept.

Excellent results can be obtained by making a cut-out in the shape of a foot, using bright poster paper. Tape this cut-out at the foul line in a good position to deliver the ball. Then make a second cutout in the shape of a face, about 4" x 4", using thin enough paper so it won't deflect the ball. Tape this one on the lane bed about 5' to 7' out from the foul line, folded so it will stand upright on the lane. By placing one foot on the foot cutout and rolling at the second one, the direction gained by bowlers is about 50% better than without the aids.

Weight of the Ball

Bowling balls are manufactured in weights ranging from 6 to 16 pounds. Choosing the correct weight for each individual is a matter for the instructor. Here are some general hints:

- Lighter weight balls are best for children and the more severely disabled.
- Bowlers who are blind do better with a heavier ball (13-15 pounds).
- Persons using the foot for delivery also do better with the heavier balls.

Buddy System

The buddy system is widely used. This utilizes another person as a buddy for the disabled person, even bowling with them if necessary. Buddies can help with wheelchairs, handling the ball, and/or positioning.

Bowling and Coaching Aids

The coach's manual of the Young American Bowling Alliance (Hutslar, 1987) contains the following informational list:

Bowling Mate (hand-held lane positioning aid). Del-Court Company, 20 Eisenhower Drive, Norton, MA 02766, 609-226-0513.

Bowling balls, pins, and sets (plastic, rubber). Mantua/Coscom, Grandview Avenue, P.O. Box 10, Woodbury Hts., NJ 08097, 609-853-0300.

Foot Forms Station Teaching System. Foot Forms, Inc. 5143 Elliot Avenue South, Minneapolis, MN 55417, 612-827-5167.

Lane Reader, The Martin (where to stand and what to hit for strikes and spares). Alleycat Products, 3684 Mill, Marion, NY 14505, 1-800-255-3922.

Lesson plans for bowling. The Lesson Plan Company, 304 Chestnut Street, Kearny, NJ 07032.

Promotions. Super Bowling Saturday Promotion Kit. National Bowling Council, 1919 Pennsylvania Avenue, N.W., Suite 504, Washington, DC 20006, 202-659-9070.

Rules. *Constitutions, Specifications, Rules, & Suggested League Rules*. Greendale, WI: American Bowling Congress. (yearly edition).

Rules. *League and Tournament Rules and Regulations and YABA Association Constitution*. Greendale, WI: Young American Bowling Alliance. (yearly edition).

Rules. *WIBC Bylaws*. Greendale, WI: Women's International Bowling Congress. (yearly edition).

Specifications. *ABC Bowling Equipment Specifications*. Greendale, WI: American Bowling Congress. (yearly edition).

Resources

Hutslar, J. (1987). *YABA Coaches' manual: Beginning bowling*. Greendale, WI: Young American Bowling Alliance.

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PRACTICAL POINTERS

GOLF

Jim Cowart

Over the past several years people have taken to heart such sayings as--

> If you treat an individual as he is,
> he will stay as he is, but if you treat
> him as if he were what he ought to be, he
> will become what he ought to be and could be.
> ---Goethe

Substantial changes have occurred in attitudes and opportunities in sport for individuals with disabilities. Where once attitudes were indifference and apathy, now they reflect optimism and encouragement. Leaders and others involved with persons having disabilities now look at an individual's capabilities, and make necessary adaptations to maximize an individual's involvement in sport.

In this Practical Pointer we look at selected adaptations in equipment, techniques, and teaching strategies that have made it possible for individuals with disabilities to participate successfully in golf.

Severely Retarded

Some severely retarded individuals may not be able to learn to swing a golf club or putt a golf ball after listening to a verbal description and/or viewing a demonstration. For these individuals, changes in teaching strategies are necessary for them to learn desired skills.

One successful approach used to teach a skill to such individuals involves a chaining procedure (Hsu & Dunn, 1984; Killian, 1988; Walls, Zane, & Ellis, 1981; Wuerch & Voeltz, 1981).

This process consists of assisting the person learn a skill by teaching successive steps of the skill in a sequential manner. Important parts of the chaining strategy include such factors as performing task analysis of the skill (breaking a skill into its component parts), sequencing parts in their natural order, deciding on a teaching methodology (total or serial chain), determining meaningful prompts, and deciding on appropriate reinforcer(s). For specific information on how to plan and utilize a chaining strategy, refer to references cited above.

An example of a task analyzed skill (putting) with prompts is shown in Figure 1. Putting was emphasized with the student (Eric) because his father was an avid golfer who practiced putting on a green in their backyard. By learning to putt a golf ball, Eric could be an active participant with his father, a meaningful and practical objective.

One difficulty experienced by Eric was squaring the club face to the golf ball. By modifying the club handle (Illustration 1), Eric was able to square the club face to the ball more consistently. In designing the handle, a hole was drilled (approximately the diameter of the club shaft) in a triangular piece of wood; next, holes were drilled in handle and shaft. Lastly, the handle was secured to the shaft with bolts.

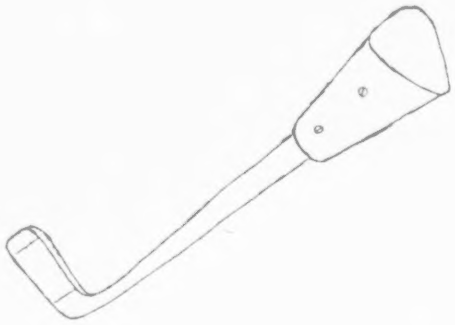


Illustration no. 1

Difficulty in Gripping a Club

Golfers having difficulty holding a club may often experiment with finger placement, special golf gloves, or reshaping the club grip to solve the problem. However, when adjustments similar to these are not successful, another approach may be necessary such as constructing a Velcro glove and sleeve (Pizarro, 1984). The Velcro glove and sleeve allow a golfer to grip the club firmly during the swing. It consists of two pieces of equipment, a golf glove and an elastic sleeve that fit over the grip of the golf club. Velcro is sewn into palm and finger of the glove as well as secured to club sleeve. Such an arrangement allows a golfer who is unable to grip a club normally to have better club control and generate more power in the golf swing.

One-Armed Swing

Adaptations for golfers with upper limb involvements seem as varied as capabilities of golfers themselves. Most, because of use of their lower limbs, are able to maintain stable bases of support.

Prompt(s):

FP - Full Physical Assistance
PA - Partial Assistance
V - Verbal Assistance
I - Independent

Name: Eric

Date: 9-20-82

Activity: Golf Putting

Instructional Universe: School & home

Basic Skills Incorporated: Movement & communication

date:	9/20	9/27	10/3	10/10	10/18	10/25	11/3					
setting:	School	School	School	Home	School	School	Home					
When told it is "golf time", Eric:												
- secure putter & ball	V	V	V	V	I	I	I					
- goes to putting area (in classroom or home).	V/FP	V/FP	V/FP	V/FP	V	I	I					
- places ball on playing area	V/FP	V/FP	V/FP	V/FP	V	V	I					
- " points to cup	V/FP	V/FP	V/PA	V/PA	V	V	V					
- grasps club handle	V/FP	V/FP	V/FP	V/FP	V/PA	V/PA	V/PA					
- stands facing ball with side to cup	V/FP	V/FP	V/FP	V/FP	V/PA	V/PA	V/PA					
- places club face behind ball	V/FP	V/FP	V/FP	V/FP	V/PA	V/PA	V/PA					
- swings & hits ball toward cup	V/PA	V/PA	V/PA	V/PA	V	V	V					

Figure no. 1

However, amount of body movement utilized in the swing depends on degree of club control and arm strength. For a thorough description of one-armed golfing techniques, the reader is referred to books by both Longo (1980a, p. 87) and Owens (1984, p. 129). Reviewed below are some successful adaptations utilizing the involved limb, or attachments to the golfer's prosthesis, to assist in providing a more controlled and powerful golf swing.

An individual with one sound limb and the other limb of limited function may find that she/he can use the involved limb in some manner of grip to help stabilize the club swing. Through experimentation, the golfer determines if the involved arm can be of help in holding and/or assisting in the club swing. If the golfer finds this adjustment is not functional, it may be necessary to rely on a one-armed swing or utilize an attachment to his/her prosthesis. Following is a brief review of three adaptations.

An adaptation developed by Vercellotti (1981) attaches to prosthesis and golf club handle. The device has a spring which allows for full rotation during backswing and complete follow-through after ball contact. For more information about this adaptation contact Wayne Vercellotti, 1415 Mason, Joliet, Illinois 60435.

The Amputee Golf Grip (AGG) (Illustration 2) is an adaptation similar to the one described above. The AGG is easily secured to the wrist socket of prosthesis and golf club. According to the manufacturer, AGG allows a simulation of the hand, grip, and wrist actions of a natural, fluid golf swing. The device is designed for both above and below elbow amputees.

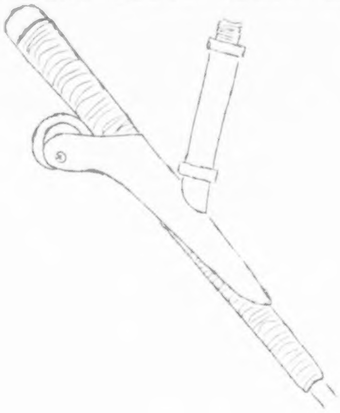


Illustration no. 2

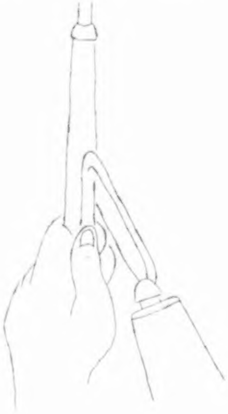


Illustration no. 3

A third adaptation (Cowart, 1979, p. 10) used by individuals wearing prostheses was developed by Robin Aids Prosthetics (Illustration 3). The device differs from the two above in that there is no flexible material as part of the unit. In spite of this, users have indicated it allows for a consistent, controlled golf swing.

Lower Limb Involvement

Some individuals have intact lower limbs but with limited functions. Others may be missing all or part of one or both lower limbs. Adjustments needed by these individuals to play golf are often related to body balance and control of club swing. Owens (1984, p, 123) believes below the knee amputees with prostheses are capable of playing golf with few restrictions. On the other hand, she felt above the knee amputees may have stability problems but can be accommodated by adjustments in club swing. (The reader is referred to this author for specific recommendations.) Noted below are suggested adjustments for persons with different areas of lower limb involvements.

- Some individuals utilizing crutches have been able to stabilize themselves with one crutch and swing the club with free hands (Illustration 4). Whether the player uses a backhand or forehand stroke is very much an individual preference. For the one-hand golfer, coordination and balance during swing are important for consistent hitting. To help maintain club control, regular golf clubs have been shortened or ladies clubs have been used. Amount of force an individual generates with a club comes mainly from shoulder, arm, and hand. In turn, this force is related to a golfer's balance.

- Some golfers having lost all or most of one lower limb (above the knee) have chosen to play while balancing on remaining leg (Illustration 5). Little in the way of adapted equipment has been needed for these individuals. Adjustments have been mainly in their swings. As noted above, shoulders, arms, and hands provide control and power for the swing. Good body balance and alignment are critical to a consistent club swing. Longo (1980a, p. 82) and Owens (1984, p. 123) present detailed explanations of a one-legged golf swing, as well as adjustments for below the knee amputees.

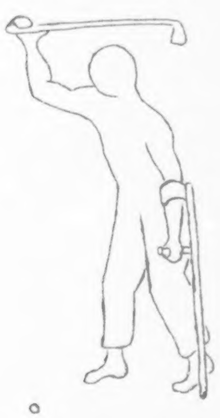


Illustration no. 4

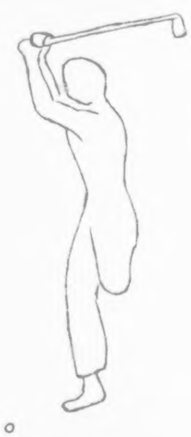


Illustration no. 5

- For a golfer with lower limb amputation who wears a prosthesis, difficulty may be experienced in rotating on the prosthesis. To alleviate this problem, a rotator was incorporated into the shank of the prosthesis (Kegel, 1985, p. 18). It simulates normal body rotation by allowing hips to rotate independently from position of the feet. Users have noted it facilitates balance and rhythm. For an individual not having a rotator built into the prosthesis, the Swivel Golf Shoe (Kegel, 1985, p. 20) is an alternative. This was a device built into a conventional golf shoe to allow rotation. It was designed to facilitate the golf swing and reduce strain on the spin. Details related to construction of both adaptations can be obtained from the reference.

Seated or Leaning Against a Stool or Golf Cart

Seated on or leaning against a golf cart or stool are viable options for individuals unable to stand and/or maintain balance while swinging a golf club. Numerous approaches have been taken by golfers, depending on their interests, availability of technical assistance, and adapted equipment. Whether a student sits or leans against a golf cart or stool, shoulders, arms, and hands supply most power for the swing. With practice an individual learns how much force can be supplied without pulling the body off balance. A few approaches to sitting or leaning against an object are reviewed below.

- One golfer in a wheelchair preferred to hit a golf ball from his wheelchair (arm rest removed) when on the fairway. After hitting the ball, the wheelchair was placed in the cart, or he held onto the cart while his partner drove down the fairway to the next shot. One problem when sitting in a wheelchair is a golfer is closer to the ground than when standing. This causes the toe of the golf club to rise off the ground at address; this shift can result in inconsistent ball flight. For this reason, when one operates from a wheelchair, consider using clubs with a flatter lie than normal (Longo, 1980a, p. 85). Another solution is to angle the shaft of a club permitting the sole to be flat on the ground, thus affording chances for more consistency (Illustration 6).

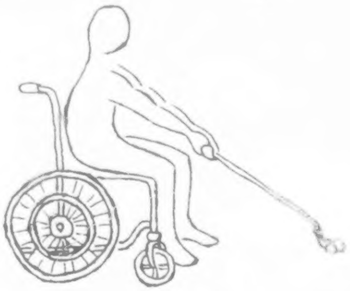


Illustration no. 6

- While some golfers choose to play from their wheelchairs, others prefer to lean against a golf cart or stool while swinging a golf club. Playing from a near standing position is to their advantage because it reduces problems a wheelchair golfer experiences. Longo described a stool made especially for a double leg amputee (1980b). The stool looks much like a carpenters sawhorse (Illustration 7). It is slanted forward for greater stability. Legs are made of strong aluminum tubing; the seat is wood covered with a fabric. The golfer places the stool in the back of a golf cart when moving on the fairway to the next shot.

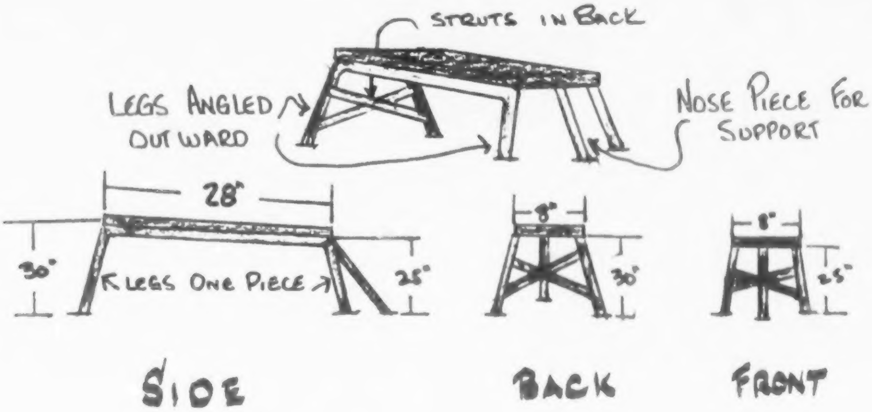


Illustration no. 7

A number of authors have described electric golf arts with swivel seats (Illustration 8) for accommodating the amputee/ paraplegic (Cox, 1976; Crase, C., 1976; Crase, N., 1980; Klein, 1979; Longo, 1989). Purpose of the cart is to provide an individual with many of the things we take for granted-- e.g., safety and speed in moving on the fairway, maneuverability in selecting a position for the swing, and safety and body positioning for swinging the club. An excellent article for specific information related to the swing while seated was written by Longo (1989).

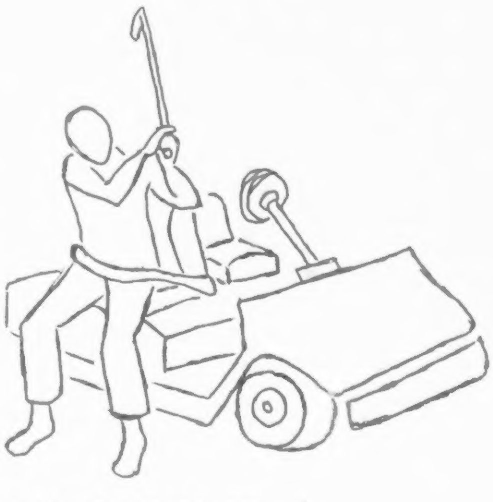


Illustration no. 8

Putting

There seem to be as many ways for individuals with disabilities to putt a golf ball as there are for able-bodied golfers. Putting principles, preferences, and strategies are covered thoroughly by other authors (Longo, 1980a, p. 107; Owens, 1984, p. 69). Emphasis of this section is on brief review of selected adjustments to assist blind and seated golfers.

- An Adjustable Alignment Device (Equipment, 1982) was developed to help blind golfers align themselves with the putting cup, as well as perform consistent swings. A sighted partner makes necessary adjustments to accommodate the blind golfer's stance and putter width. Once these adjustments have been made, the device is ready for use.

- Audio Putting Devices, sound devices for directional cues, have been used in many activities by people with visual impairments. Two beepers successfully used for golf putting are described and illustrated below. One beeper device was made for use at school (Cowart, 1989) (Illustration 9), and the second (Cowart, 1990) (Illustration 10) was constructed for use at a miniature golf facility or on golf course putting greens. Specific information regarding construction of these devices can be obtained by referring to indicated articles.

Illustration no. 9

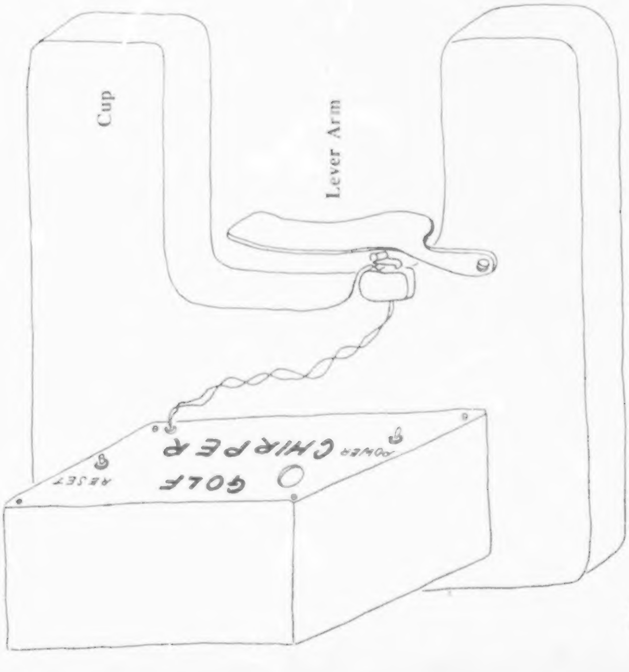
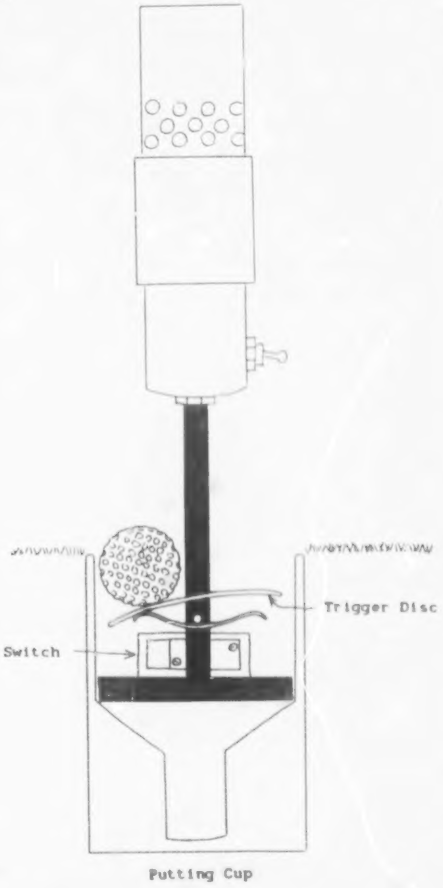


Illustration no. 10



- Seated Golfers. Chair golfers are restricted from using putting greens while in their wheelchairs or golf carts. However, some adjustments have been made to accommodate seated golfers. First, putting can be eliminated from the game. Another alternative is to count two putts once the ball is on the green. A third method of scoring is to consider balls that come to rest within a ten foot (five foot club length) radius of the cup as holed out. Still another adjustment made by one golfer was to sit on a cushion to putt. A fifth consideration is to have the golfer putt while standing with aid of crutches. Finally, for the individual leaning against a stool, padding can be placed under stool legs to prevent damage to greens.

Conclusion

This **Practical Pointer** has reviewed equipment adaptations and teaching strategies allowing golfers with disabilities access to activities from which they were formerly excluded. Each adaption was created by individuals believing participating in golf is a viable experience for anyone, no matter the disability. It is through efforts like this that capabilities of all individuals are maximized.

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PRACTICAL POINTERS

GYMNASTICS INSTRUCTION

Karen Allen

Activities allowing individuals to work at their own pace, progress as personal knowledge and skills develop, and demonstrate achievement are ideal for individuals with disabilities. Gymnastics, with its wide variety in choice of events and great variance in level of performance, can provide unique opportunities for participation. Balance, agility, strength, muscular control, speed, endurance, flexibility, and rhythm, can all develop as students learn gymnastic skills. Appreciation for individual accomplishment, pride in performance, and a sense of artistry can contribute to each gymnast's self-esteem and confidence. Gymnastics is beautiful!

Gymnastics also has a risk factor. Potential for serious injury is greater in any sport involving height, momentum, and body position characteristic of gymnastics than it is in other sports (Carpenter, 1985, 1). Participants can be injured, even killed. Gymnastics has a strong element of danger (Aykroyd, 1980, 7). Should individuals with disabilities be exposed to this danger? Will their disability increase the danger factor? Will their participation increase the danger factor for peer participants? Should individuals with disabilities participate in gymnastics?

This Pointer focuses on gymnastic instruction for individuals with disabilities. Yes, individuals with disabilities should have opportunities to participate in gymnastics. Safety is a prime concern and safe instructional settings can be created. When proper safety precautions are followed, this activity is no more dangerous than most other worthwhile physical education activities (Ryser, 1968, 7). Values inherent in gymnastics can acrue to disabled as well as nondisabled participants. Create an instructional program focusing on modification of skill technique for individual differences and apply sound gymnastic teaching methods and all students will benefit!

Value of Gymnastics for Disabled Individuals

Value of gymnastic participation does not change from person to person. Improvement of components such as balance, agility, flexibility will occur whether a person has one arm or two; whether a person can read or not; whether persons can see the rings clearly or through a haze. Weighting of values does change. For someone with poor balance at the start of gymnastics, improvement in balance is more important than for someone with good balance. Each of the following values can benefit any gymnastic participant. Degree of benefit increases as level of disability and resulting impairment increases. Gymnastic participation can--

> improve perceptual-motor function, including balance, body image, laterality, directionality, spatial orientation, sequencing, hand-eye and hand-foot coordination, and occular control
>
> improve physical fitness components, including strength, flexibility, endurance, and cardiovascular function
>
> improve motor fitness components, including ability, speed, rhythm, and coordination
>
> enhance aesthetic development, including creativity, expression, and appreciation
>
> enhance socio-emotional development, including self esteem, self-confidence, emotional control, and peer interaction
>
> enhance learning skills, including direction following, self-discipline, listening, helping others, and assuming responsibility, and
>
> enhance intellectual development, including knowledge about body movement, gymnastics as a discipline, practice, performance, competition, and judging.

Values, however, are not automatic. For students to benefit from participation in gymnastics participation must take place in a safe environment and participation must be successful.

Creating a Safe Instructional Environment

Gymnastics itself is not unsafe. It is the method of participation rather than the sport that can make it unsafe (Carpenter, 1985, 1). Students with disabilities are often at a higher level of risk than students without disabilities. Sensory input may be limited, intellectual processing diminished, judgment impaired, or body control restricted. It is therefore particularly important instructors take an active role in creating a safe instructional environment. Carpenter (1985, 1) recommends the following questions be resolved before any gymnastic participation occurs--

- Is the equipment safe?
- Is the location of the equipment safe?
- Are emergency procedures set up to deal effectively with any emergency that might occur?
- Is there any way to decrease the risk by altering the teaching progression?
- Is there any way to use padding, work lower, or use a spotting belt to decrease the risk?
- Is the gymnast physiologically ready?
- Is the gymnast psychologically ready?
- Is the gymnast cognitively ready?
- Does the spotter understand the skill and its common errors?
- Is the spotter physically capable of providing an adequate spot?

Every gymnastic program should have safety rules. All participants, disabled and nondisabled alike, must be expected to follow these rules. While teachers will need to establish rules for their particular programs, following are a representative sample--

- Wear proper clothing. Remove all jewelry. No eating or gum chewing.
- Warm-up before any gymnastic activity.
- Wait for permission before going on any equipment.
- One person at a time on all equipment.
- Perform stunts as taught to you. Do not improvise or try stunts taught to others.

- Use a spotter.
- Report any broken equipment or mats that seem wrong.
- Report all accidents.
- Rest and/or cease activity when tired.

Keep wording of rules simple and direct. Emphasize positive behavior. Discuss rules with participants before participation. Include discussion on serious consequences of misbehavior. Tell participants they can be seriously injured (give examples of serious injury). Tell participants they can be killed. Be sure they understand. This is not meant to scare them. It is meant to bring emphasis to the seriousness of the need for safety in gymnastics. It is also to protect teachers in event of litigation. Students must be forewarned about inherent risks of a sport or activity (Nygaard, 1987, 66).

Having rules does not ensure safety. Teachers must enforce rules and make an ongoing effort to provide the safest possible environment. Teachers must--

- supervise gymnasts as all times
- provide skill instruction in a progression appropriate to age and experience of gymnasts
- teach and reinforce safety procedures, and
- structure practice of skills so all can participate in a safe manner.

When working with individuals with disabilities additional safety precautions may be necessary. Teachers should--

- determine whether individuals have medical contraindications to gymnastic participation
- use pictures as well as printed material and spoken words to explain rules and procedures
- make careful choices in selecting spotters for gymnasts with disabilities and in allowing gymnasts with disabilities to spot for others
- modify activities as needed to fit individual abilities of participants with disabilities, and
- modify equipment as needed to fit individual abilities.

There are a great variety of gymnastic texts which can provide teachers with more detailed information on safety related to specific equipment and/or events. A partial list can be found at the conclusion of this Pointer.

Creating a Successful Learning Environment

The second key to beneficial gymnastic participation for individuals with disabilities is success attainment. Learning stunts and routines, accomplishing skills and progressions, brings pride, self-esteem, and other values previously listed. Because gymnastics is divided into many different performance areas, teaching techniques will vary.

Respect individual differences and rates of learning. Recognize skill mastery can vary greatly in time and quality. Performances will show varying degrees of quality and may never measure up to ideal levels of perfection.

Traditional differentiation occurs between men's and women's equipment. At the beginner physical education class level however, this differentiation is not necessary. Elementary school children learn balance, movement, dance, and tumbling skills. As children mature into intermediate/middle school they work on equipment. It is not unusual to see boys on balance beans and girls on rings. Children need variety to develop a broad skill base. Often, skills learned on one piece of equipment aid skill development on another. It is only at the competitive level that sex differentiation is complete.

Here gymnastic activities will be presented from the unisexpoint of view. The term activity will be used rather than event as emphasis is on instruction rather than competition. Selection of particular activities will depend on--

- equipment available
- space available
- age, ability, and experience of students
- goals and objectives for students, and
- teacher experience and knowledge.

All generally accepted activities are presented. However, all activities need not be taught. Teachers should make selections and vary curriculum as needed. While this Pointer is intended to aid middle and high school teachers, teaching elementary level skills may be necessary when working with individuals with disabilities. Several sources (Orlick & Mosley, 1963; Donaldson, 1968; Szypula,

1968) have been included for that purpose. For each activity specific teaching hints are cited to aid teachers in structuring for participation by individuals with disabilities in mainstream or adapted physical education settings.

Balance Beam

- Include one foot balance activities in warm-up activities.
- Use a floor line to introduce and practice a new skill.
- Have beams at a variety of heights available; allow students to select a working height comfortable for them.
- Include activities sitting and lying on the beam.
- Allow students to hold the hand of their spotter.
- Stack extra mats under beam for spotter(s) to stand on. This can allow safer and stronger assists to performers.
- Teach how to fall. Explain how grasping or grabbing for beam can increase chances for injury. A push away from the beam is preferable.

Dance

- Dance has been added as a developmental and competitive event in the United States Gymnastics Federation Women's Program. It provides another area of interest and potential success.
- A performer with a physical disability limiting tumbling skills and/or strength may find dance rewarding.
- Basic dance positions and locomotor patterns can be taught and performed seated or standing. Arm/hand and leg/feet positions can be performed separately or unilaterally.
- A lowered balance beam can substitute for a ballet bar for practice (see photo).

- Using mirrors provides valuable feedback to some performers but may create a distraction to others.
- Learning correct pronunciation of French ballet terminology can add fun and mystique to dance and gymnastics.

Horizontal Bar

- Start with bar at shoulder height and gradually raise it as strength and control develop.
- If true horizontal bar is not available use the high bar of the uneven bars to introduce horizontal bar activities.
- Horizontal bars found on many school playgrounds can be utilized for teaching beginning skills. Be aware of landing surfaces. Pea gravel can cushion landings and falls.

Parallel Bars

- Start with bars at shoulder height and gradually raise them as strength and control develop.
- Beginning skills on parallel bars are very similar to beginning skills on rings. Pair these pieces of equipment to make use of transfer of skills.

Pommel Horse

- Start with the horse at its lowest level and raise it as skill and control develop.
- This horse can also be used for vaulting. Having the pommels gives the gymnast extra height off the horse. Vaulting pommel horse is not recommended for students with visual impairment.
- Spotters on both sides of horse can increase safety factors.

Rhythmic Gymnastics

- Rhythmic activities include balls, hoops, ribbons, and clubs. Modifications to apparatus may be necessary for successful participation. Such modification might include--

  ... Make ribbons from dowls, fishing hardware, and 2 inch wide ribbon. Length/width of ribbon and grip size/shape of dowl can be adapted to individual need.

  ... Substitute a junior size rhythm ball or playground ball for the larger rhythm ball. Use a nerf ball for reduced weight. A contrast in color between ball and gym floor/walls helps with tracking skills. Slight deflation of ball controls the height of bounce.

  ... Substitute hula hoops or extra large embroidery hoops for regulation hoops. Hoops of solid plastic are more resistant to breakage than hollow tube hoops.

  ... Ropes are made of soft hemp. Some macrame materials can be substituted. Rope length is usually determined by height of gymnast. Jumping skills can be excluded from activities. Emphasis on turns, swings, and directional changes can make rhythmic rope activities more appropriate.

- ... Clubs may be used one at a time or as a set. A plastic bowling pin can be substituted. Clubs are quite challenging and may not be appropriate for all gymnasts.

- Be sure to allow ample space around each participant.

- Stress control of equipment first and increase amplitude of movement as control increases.

Rings

- Start with rings at shoulder height and gradually raise them as strength and control develop.

- Use rings in stationary position only. While some facilities do have and use flying rings, they are high risk.

Ropes and Poles

- Start with pulling from a prone or supine position on mat up to a stand. This improves arm strength without adding any danger.

- Allow students to climb up only as far as they can also control the descent. First teach descending, then teach climbing.

- Two rope/two pole skills are very similar to ring activities. Pair this equipment to facilitate transfer of skills.

Trampoline

- There are specific guidelines regarding use of this high risk equipment (National Association for Sport and Physical Education, 1978).

- Huber (1989, p. 51) recommends the following should be taken into consideration when developing an effective risk management program--

  - ... Parent or guardian written permission;

  - ... Physician contraindications, e.g., damaged retina, atlantoaxial instability;

  - ... Strategies for safely folding, unfolding, and securing the trampoline;

... Guidelines for mounting, dismounting, and bouncing;

... Spotting techniques which include physical contact, spotting belt, and safety harness;

... Restriction of all other gymnasium activities when the trampoline is in use;

... Moderation of class size to accommodate students' needs and levels of functioning.

. A trampoline can be used to introduce skills requiring air sense. It can also be used to reinforce and refine previously learned skills.

. Additional use of a spotting belt can allow hands on maneuvering through a new movement and increase performer confidence.

. Color contrasting perimeter mats covering springs gives increased safety and provides feedback as to location on trampoline bed.

. A rope woven into the center webbing gives tactile cues as to location on trampoline bed.

. Spot with spotter's hand directly over and holding on to performers hand. This helps hold performer's hand in place, reminds them to hold on, and lets the spotter know immediately if performer is slipping.

. Mini tramps can be used as their own skill unit or as a supplement to teaching skills used in other events, such as...

... an aid in teaching dismounts or jumping skills

... a lead-up to the trampoline, and/or

... just for fun.

Always use a landing mat and provide adequate spotting.

Tumbling/Floor Exercise

. Start with stationary stunts and balances and progress to locomotor skills.

. Keep sequences short. Gradually increase length of sequence as students master skills. Lengthen sequence by adding to previously learned sequence.

- When working on routines, mark the mat to show direction of travel and cues for specific parts of routine.

- When choreographing floor work to music a tape player with variable speed is helpful.

Uneven Bars

- Start with individual stunts on each bar. Save combining skills into a sequence for when a group of individual skills have been learned.

- Teach high bar skills on low bar first where they can be more easily spotted.

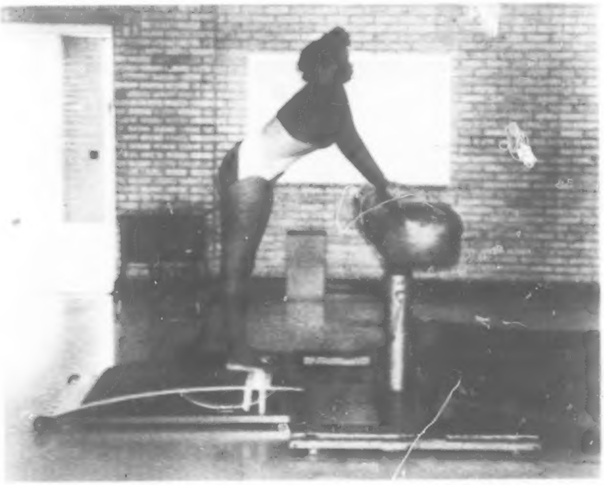
Vault

- Break this event into as many small skill learning steps as possible.

- Start vault progression without the box or horse. Teach run up, jump, and landing on crash pad first.

- Start with vault at chest height. Use a short, easy walk/run up or even start with hands on horse.

- Use a board with the least amount of spring. Possibly start without a board if the vault is low.



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Modifications for Specific Disabilities

Because of the nature of specific types of disabilities modification of teaching technique and/or adaptation of skills may be needed. Do not assume such modification or adaptation must occur when an individual with a disability participates. Rather, be ready to suggest if a gymnast is having difficulty or if the individual's safety is in question.

Auditorally Impaired

Because balance is influenced by inner ear, students who are deaf or hard-of-hearing may also have balance problems. Vision is their primary information source. Rhythm is a feeling rather than a sound. However, there is nothing related to auditory impairment precluding gymnastic participation and accomplishment of even the most difficult skills.

- Be prepared to show pictures and present demonstrations of skills to be learned.
- Have printed material available on rules, procedures, safety so there is no misunderstanding of these critical issues.
- Remember, students have to see a person's mouth to lip-read. Calling out a warning to a deaf student will not be effective.
- Learning signing is appropriate if students sign and signing will be used frequently. However, signing is a language and it will be difficult to remember if it is not used.
- Gestures will enhance the communication process. Try to keep frequently used gestures consistent. If "stop" is your hand held up, palm flat and open and facing the person, then use this gesture every time you want students to stop.
- Experiment with different rhythm sources. Floor exercise is done to music. Try performing to a drum beat. Vary the instrumentation -- flutes have a higher pitch than bassoons. Help students develop internal performance rhythms.

Emotionally Disturbed

Individuals with social/emotional disturbance often have difficulty in adjusting their behavior to what is appropriate for a particular time and place. They may act out, they may withdraw.

Their reality of what is happening and why may not be accurate and thus neither will be their response. Successful participation in gymnastics will depend on their ability to make their behavior suitable to the activity.

- Clear structure must be provided for all gymnastic activity. Students must be aware of what behavior is appropriate and why. Keeping facility set-up, class format, procedures, behavior expectations the same each day will help students with emotional disturbance.
- Reinforce all rules and safety procedures. Keep discipline consistent and fair. Explain consequences of inappropriate behaviors. Teach appropriate behaviors.
- Do not hesitate stopping an unsafe activity or a situation where behavior is inappropriate. Talk about what is happening and why. Help students learn and practice acceptable behavior.
- Have a time-out procedure. Sometimes stress affects behavior--stress from a previous class, an earlier unfavorable peer encounter, problems at home, or negative teacher interaction. Students may not be ready or able to control their behavior. Give them a place to get themselves together, a quiet, nonthreatening place where they can take their time with control of their emotions and behavior.
- Anticipate needs for time-out. Asking an agitated student if they need a time-out is no fault (the student is not in trouble at this point and may need a time out in the same way someone may need to go to the bathroom). If a student requests a time-out, let them have one. Often a student can join the activity later. This system is far better than forcing participation, having a student get into trouble, and then having to force the time-out.
- Encourage responsibility for individual behavior. A student who requests a time-out when behavior is becoming stressful is behaving responsibly.
- Recognize students with emotional disturbance may need assistance in structuring their behavior. Good role models are important, as is a calm, reasonable atmosphere.

Health Impaired

- Some health conditions may influence a student's participation in gymnastics. When in doubt, contact parents and/or doctors for recommendations before activity. Following are specific examples of health conditions/medical problems that would affect gymnastic participation. This is not an all-inclusive list. Teachers should do a health survey of all students prior to participation.

- Seizures. Students with active seizures should be prohibited from activities involving height. Students with medically controlled seizures still need supervision during height involved activities.

- Breathing problems. Students with asthma and other breathing related conditions may have difficulty in areas where magnesium is being used or if mats are not kept clean. Stress the need for all students to use mag trays carefully. Keep mat areas clean.

- Bone and joint problems. Students with knee problems or a bad shoulder, for example, need medical follow-up to determine what activities might be contraindicated. Atloaxial hyperplasia (associated with Downe's Syndrome) may indicate need for precaution in gymnastic participation.

- Diabetes. Keep extra candy or sugar item handy for the diabetic participant. Caution them to let you know if they start to feel ill. Energy expenditure can alter insulin/medication processing in the body.

- Shunts. Students with shunts, whether or not shunt is presently functional, should obtain medical advice on contraindicated gymnastic activities.

Learning Disabled

Students with learning disabilities may have balance, body image, spatial orientation, attention span, sequencing, direction following, and/or judgment problems. Gymnastics can greatly enhance their motor development as well as aid in behavior management. Participation can also reinforce learning skills.

- Clear structure must be provided for all gymnastic activity. Students must be made aware of what behavior is appropriate and why. Keeping class set-up and format, procedures, behavior expectations the same each day will help learning disabled students.

- Reinforce all rules and safety procedures. Keep discipline consistent and fair. Explain consequences of inappropriate behaviors.

- Include balance and spatial orientation activities in warm-up.

- Be aware students may not be able to tell how high they are off the ground. Spot all activities involving height. Increase height slowly and only after students show proficiency at lower level skills.

- Sequencing may be difficult. Use two and three part sequences before longer ones. Be aware many single skills are in and of themselves a several part sequence (a squat vault is a sequence--run, take-off, on horse, body tuck, off horse, body stretch, landing). . Spatial orientation may be difficult. Students may not know where they are--or how to get back to upright--when inverted.

- Recognize learning disabled students may have more difficulty learning skills as well as controlling behavior when the gym is busy and the noise level is high. The greater the stimulation in the environment, the harder the learning and behavioral tasks for students with learning disabilities.

Mentally Retarded

Students with mental retardation exhibit a wide range of intellectual and physical functioning. Range of individual differences among individuals with retardation is probably far greater then among the so-called normal (Sherrill, 1981). It is important to become personally acquainted with students to recognize different stages of development and identify individual learning styles. Deficits in attention span and behavioral limitations require slow, sequential, and specific teaching. Patience and realistic goal setting are important in minimizing student and teacher frustration.

- Be aware that multiple handicapping conditions may exist which may affect teaching/learning styles.

- Incorporate games, drills, and group activities to review previously learned skills.

- Use positive reinforcement. Be quick to praise. Point out the good part of an attempt before adding corrections. For example, "You remembered to point your toes during that jump; don't forget to keep your head up too."

- Use visual aids and hands on demonstrations whenever possible.
- Always plan lessons, but remain flexible to change these plans to meet individual needs.
- Follow an established routine or schedule for each lesson. Keep students informed of any changes.
- Attempt to avoid repeated frustrations and failures.

Physically Disabled

Students with physical impairment may have a missing or nonfunctional body part. They may have body parts that do not function normally. Braces, crutches, catheters, and/or wheelchairs may be part of their equipment. Even the individuals with the most severe physical disability can usually participate in some form of gymnastic activity. Being out of a wheelchair is important. Getting down onto a mat to stretch, perform log rolls, use different parts of the body for support and locomotion builds fitness. Individuals with physical disability can participate in gymnastics, if instructors are alert to things such as the following--

- Keep crutches and wheelchairs off mat areas. Students can leave them at the side and crawl or scoot to their performance place.
- Removal of braces should be done upon medical recommendation. Individuals with fragile bones need braces for protection. Individuals with severe muscle contractures need braces for proper positioning. Check with the doctor first.
- Participation wearing braces is acceptable. However, be aware this adds extra weight for the student to lift and additional weight to control while in motion. Avoid heavy landings wearing leg braces.
- Students with bowel/bladder problems should be sure to use the bathroom before activity. Empty collection bags, be sure all appliances are securely in place. Be aware inversion activities may result in bowel/bladder accidents.
- Avoid heavy landings/dismounts if individual has lower extremity/lower back involvement. Many individuals with lower body disability have normal (and strong) upper body/arm capability. These individuals will work particularly well on rings, ropes and poles, parallel

bars, pommell horse, but will need to eliminate the dismount (or be spotted to a soft landing).

- Inversion activities may be contraindicated for individuals having cerebral shunts. Obtain medical advice prior to participation and discontinue activities if headache, dizziness, and/or nausea results.
- Modify routines to fit needs of individual students. A student with a single leg amputation will have difficulty with a knee upswing from low bar to high bar but will do just fine with a low bar kip or back hip pull-over to make the same transition.
- Involve students in stunt/activity modification process. Individuals with physical disabilities are often used to modifying their activities. Help them continue that independence.
- Teach falling. Some students may be fearful of falling. Others may not be able to control body parts as they fall. It may be necessary to teach protective extension of arms, relaxing, rolling to land on shoulders or seat, or giving as feet hit mat. Be sure to practice on soft surface.

Visually Impaired

Many individuals who are blind or visually impaired show deficits in physical growth and maturation due to limited opportunities for engagement in physical activities. Kinesthetic awareness and posture may be poor. Stereotyped behavior known as blindisms or mannerisms may be present and interfere with normal motor patterns. Gymnastics is an ideal activity to remediate these conditions.

Certain eye conditions (loss of depth perception, tunnel vision, light sensitivity, etc.) may require special consideration or activity modification. Check students' medical records to see if physical limitations have been imposed.

It is a myth that remaining senses are automatically enhanced to compensate for loss of vision. Special training and opportunities to develop remaining senses, including proprioception, are essential.

- Gymnastics has a special vocabulary. Words like tuck, pike, and kip may have no conceptual meaning for someone who is totally blind. Do not assume full understanding of a movement always takes place. Check and recheck.

- Take advantage of all residual vision by using color contrast and appropriate lighting.

- Use an extra layer of mats and cover all exposed metal bases (and parts thereof).

- Adapt the floor exercise area by placing a contrasting color of tape around perimeter. A portable sound source or tape player placed in one corner also gives audible cues for location.

- Lower height of beam to match ability of gymnast. Use contrasting tape or tactile tape near ends to signal turns or dismount.

- Allow a vaulter to use a running take off, a one or multiple step take off, or a two or three bounce take off from the board. Vaulters can also run toward verbal calling of a coach standing on the opposite side of horse.

- Use a buddy system. A sighted buddy can provide socialization and help ensure safety of a partner with visual impairment.

- Orient students to stationary objects and large pieces of equipment in relation to walls and other equipment. Place warning flags on cables. Be sure to tell students if equipment has been moved.

- Try to set up equipment in same formation every session. Tell students ahead of time if formation varies.

- Allow students who are blind to braille or feel you or another student move through a new skill. Use a small doll for full body modeling.

Opportunities for Competition

Competitive gymnastics can be very fulfilling for individuals who have the personal drive, interest, and desire to train. It is exciting to compete, challenge ourselves and feel successful. Individuals with disabilities can pursue these feelings as well. Learning perseverance, and how to accept defeat as well as victory is part of total development.

Sanctioned competitive programs for special population groups are currently offered by the United States Association for Blind Athletes and Special Olympics. The sports governing bodies for wheelchair athletes, amputees, cerebral palsied, dwarfs, and les autres do not have organized competitive programs at this time.

They do act as resources in locating experienced coaches or recreational programs.

United States Association for Blind Athletes--USABA

USABA offers a competitive women's program at regional and national levels. Gymnasts compete in floor, bars, vault, beam, and dance using United States Gymnastics Federation's (USGF) Developmental and Compulsory Routines. There is an optional division with some special requirements. Gymnasts do not have to compete all around and they may cross over to different levels of ability with each event. A special provision divides competition into three functional visual classifications. This means a gymnast who is totally blind will compete only with other gymnasts who are totally blind.

USABA has a growing youth development program. It provides resource information, youth sports workshops, and coaches training.

Most private gymnastic organizations are affiliated with USGF and use their programs. Many gymnasts who are visually impaired have received training and preparation for competition in USABA competition in USGF gyms. Compulsory programs are identical.

For more information contact: USABA, 33 North Institute Street, Brown Hall, Suite 015, Colorado Springs, CO 80903, (719) 639-0422.

Special Olympics

Special Olympics competitive gymnastics program offers artistic competition for men and women, rhythmic competition for women, an optional code of points for more advanced gymnasts, and a developmental level. The Official Special Olympics Summer Sports Rules manual (Special Olympics, 1988) contains copies of all routines, rules, and judging criteria. Special Olympics offers coaches training clinics and certification for its coaches and volunteers. Contact: Special Olympics International, Inc. 1350 New York Avenue, N.W., Suite 500, Washington, D.C. 20005.

Within the Mainstream

Competitive opportunities in mainstream settings occur at both school and private club environments. If intramural gymnastics are offered in local schools those programs, by law, must be open to students with special needs. This is also the case with high school varsity gymnastics. The individualistic nature of gymnastics makes it ideal for accommodation of all students within regular school programs.

The United States Gymnastics Federation has a well written developmental and competitive program. The USGF provides training seminars, safety certification, and up-to-date publications and videos for its member coaches. Most private gymnastic clubs are affiliated with the USGF. Gymnasts with disabilities have successfully trained and competed in USGF programs across the country. USGF program compulsory program is developmental and sequential. A gymnast must test out of a lower level before moving on to the next higher level. Contact: USGF, Pan Am Plaza, 210 S. Capitol, Suite 300, Indianapolis, IN 46225, 1-800-345-4719.

Conclusion

Gymnastics is a great activity for all children. It is an outgrowth of spontaneous play exhibited by kids everywhere. When observing typical free time play, basic forms of gymnastics movement occur frequently--running, climbing, jumping, leaping, hanging, swinging. Taking these movements into classroom settings allows for new learning and refining of natural actions under safe and supervised conditions, increasing joy of movement.

The basic movements previously mentioned are components of health and skill related fitness, perceptual motor function, and motor skill development. These are some of the areas in which special population students typically exhibit weaknesses or delays. Basic gymnastic skills are listed in gross motor inventories. They have been regarded as milestones in development. Gymnastics is a great way to provide remediation and refinements of motor skills while complementing totality of human development.

Teaching gymnastics to individuals with disabilities must include a special commitment from instructors. Instructors must go beyond basic principles of safety and supervision. Instructors must be creative and ambitious in order to successfully modify and adapt instruction to appropriate levels of cognition and physical ability of gymnasts. Instructors must be responsible and knowledgeable to modify learning environment effectively to meet individual needs. Instructors must be diplomats to enlighten local communities. Mainstreaming is desirable and possible. Instructors who take time to develop these characteristics can be assured they are providing a quality gymnastic program, guiding students to optimal development.

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PRACTICAL POINTERS

MAINSTREAMING THE DISABLED FOR INDIVIDUAL SPORTS

Susan J. Grosse

Expecting all students with disabilities to join classes of nondisabled peers and participate in individual sport activities on equal bases is perhaps an unrealistic goal. However, it is equally unrealistic to assume because students may move slower or in different manners, possibly think slower, or receive information from altered sensory data, skilled participation in individual sports with nondisabled peers is impossible. Individual and dual sports provide unique opportunities for all students to take classes together.

With instructional emphasis on individual skill development and a class atmosphere encouraging all to participate to the best of their abilities, mainstreaming can flourish and everyone involved benefit. It is at middle and high school levels foundations in individual/dual sports are established in physical education classes and applied during intramural programs. Whether students with disabilities go on to participate in varsity athletics, join adult sport programs, or recreate with family and friends, they need the same instructional opportunities as nondisabled students. Whether individuals are to become sport announcers or television tennis fans, they still need basic knowledge of how games are played.

Nondisabled students have always had this opportunity. Now, with current emphasis on integration, individuals with disabilities can have this chance also. Following are practical pointers designed to facilitate mainstreaming impaired, disabled, or handicapped students into regular physical education classes during instruction in individual/dual sports.

Class Organization and Instruction

Class organization either facilitates instruction or detracts from it. When integrating students with disabilities class organization is critical to creating successful learning environments.

- Establish an atmosphere of acceptance of all students in class, emphasizing abilities of each student and the positive contributions each can make to group successes.

- Individualize instruction by allowing each student to perform standard skills in as functional manners as possible.

- Expect students to assume responsibility for their own special equipment. Vigorous activity tends to loosen screws and bolts on crutches and wheelchairs. For safety's sake, students must keep their equipment in good repair. Hearing aids should be worn during individual sports, as should glasses (except in the case of a contact sport). Be sure lenses are plastic or safety glass. Wearing an elastic head strap will ensure they stay in place during activity. It may also be helpful to keep a small tool kit--pliers, screw driver, heavy tape, extra wing nuts--available for emergency situations.

- All students should be required to participate in pre-play activities such as. . .

    ... general physical conditioning;

    ... specific class warm-up activities;

    ... learning how to fall, especially if the student uses a wheelchair or crutches--falling is not a disaster. Everyone who has played a sport has fallen at some time or other. However, students with crutches or a chair need to learn how to fall safely and then untangle and get back into participation;

    ... chalk-talks or verbal explanations. Even if students cannot see or hear the entire presentation, they can still achieve some benefit from what they pick up with their other senses; and

    ... skill drills and individual practice.

- Do not make the mistake of excusing or excluding students from a facet of instruction because you think they may not understand or benefit from it. Rather, encourage students to obtain as much information and development as they can. Remember, a teacher's expectations often dictate just how much a student will learn. Don't hinder a student's chances by setting your expectations too low.

- Make use of exceptional education support staff. Provide exceptional education classroom support teachers with study materials on sports being taught. These teachers can reinforce skills and concepts being taught.

- Make use of additional instructional resources. Films, videos, and computer programs all contribute to the learning experience. A student who cannot swing a golf club may be able to play a very knowledgeable game of computer golf.

Safety

Make disabled students aware of and expect them to observe safety precautions relevant to their situations.

- Students in wheelchairs should use footrests, seatbelts, and other assistive attachments. Taking them off to obtain a better playing position leads to accidents.

- Students in wheelchairs may need assistance on propulsion. If propulsion is part of the sport, as in wheelchair slalom, students should propel themselves. If propulsion is secondary to the sport, as in retrieving arrows, other students may assist.

- Students on crutches should be discouraged from using their crutches as implements of the sport involved. Crutches should be used for support and locomotion.

- Boundary areas should be clearly marked. High visibility tape or rough surface tape can be used if students are visually impaired. Using a whistle to stop participation if someone is out of position can keep someone from being hit with a golf club or arrow. A light signal can tell hearing impaired students when it is safe to move.

- Behavioral expectations should be clear and enforcement of rules consistent. This will help students with learning disabilities or behavioral/emotional disturbances control their behavior.

- Lesson structure should be specific to the sport being taught. Students with disabilities often function more productively in structured instructional settings as opposed to experimentation or free play trial and error.

Drills and Skill Practice

There are essentially two types of drill and skill practice commonly used in sport instruction--stationary practice and moving drills.

Stationary Practice

For stationary practice all students should be able to participate on fairly equal bases. Students perform skills as taught using their own equipment and their own individual space, whether in gym or outside. Students who catch on to explanations quicker or who move faster may get more practice done than others. Some students will need more individual help. To facilitate stationary practice--

- Modify equipment to enhance successes of special needs students. Experimentation may be necessary to determine specific modifications needed by individual students. This might include:

  ... building up a handle to make a club or racket easier to grasp;

  ... adding a cuff to a paddle or racket to attach it to the student's arm/wrist/hand;

  ... adding a sounding device at a target to make it easier to locate;

  ... increasing target visibility by changing its color or increasing its size;

  ... tethering a practice device such as a ball to make it easier to hit during the early learning phase;

  ... increasing size of equipment--using a larger head tennis racket, for example, to increase success at hitting the target;

  ... decreasing distance from student to target;

  ... decreasing speed of performance--performing self-defense in slow motion until patterns are learned;

  - decreasing weight of equipment to make it easier to handle; and
  - decreasing size of equipment--shortening length of a racket handle, for example, to increase success at hitting the target.

- Place students needing more help closer to the front of the group. Their performances can be easily monitored there and coaching done without the teacher moving too far.
- Pair students needing more help with more advanced students willing to provide assistance.
- Provide additional space for less skilled students.
- Provide several different ways to practice the same skill. For example, mobility impaired students may need to work with a tethered tennis ball to make retrieval easier.
- Post wall charts or pictures in areas where less skilled students will practice.
- Set up a before-class practice area for those students who need additional assistance.

Stationary practice is something in which all students can participate. Examples of stationary practice are--

Archery--stringing a bow
Badminton--swinging a racket for specific strokes
Bowling--adjusting ramp; using pendulum arm swing
Golf--swinging club
Pickleball--hitting ups and downs off a paddle
Self Defense--performing stances and positions
Tennis/Racketball--hitting ups and downs off a racket
Wrestling--working on pin positions/combinations

None of these activities require interactions with other players. As a result, students are able to function at their own particular levels of speed and ability, while still developing skills necessary for game play.

Moving Drills

Moving drills require students to apply skills learned during stationary practice either through interactions with other players or in situations involving movements around playing areas. Examples of moving drills include--

Archery--shooting at targets
Badminton--tossing to partner and hitting back and forth
Bowling--swinging and releasing ball rolling to partner
Golf--putting to partner
Pickleball--volleying to partner without a net
Self-defense--performing position combinations
Tennis/Racketball--tossing to partner over net and hitting return
Wrestling--working on take-downs

To organize moving drills so everyone gets maximum practice on level with individual ability, it might be helpful to--

- Provide for an even distribution of students with disabilities among squads or practice groups. Having some strong students combined with some students who may need a little more work keeps groups moving at a more even pace. It also provides good student models in each group and gives teachers opportunities to circulate throughout the class monitoring performances and giving help instead of tying teachers to one slow group.

- Change practice groups frequently. Give students opportunities to practice with a variety of peers and skill levels. One person should not always be stuck in the same group.

- Give special consideration to students who are obviously less mobile than the rest of the class by. . .

... placing them in a squad whose total number of students is less than others to help equalize time needed for performing activities;

... having a less mobile student go second or third during a relay rather than last (emphasizing their slowness) or first (getting the group off to a slow start);

... designing drills where mobility-limited students remain in one place, the rest of the group rotates around them;

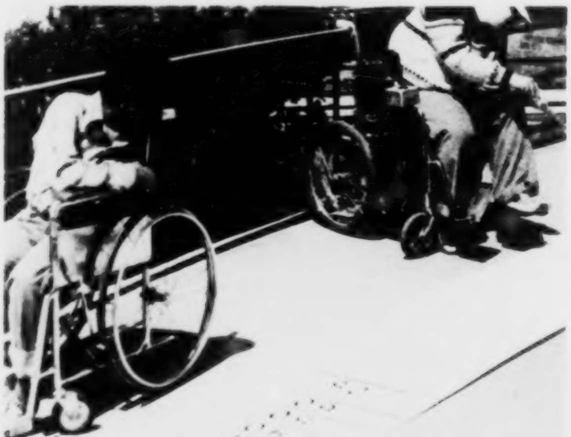
... using the station method, students do moving drills but at their own individual paces at a particular station in the gym; and

... designing a circuit system based on skills being developed--students work the circuit relative to their own levels of functional abilities.

. Emphasize purpose of a drill is to help individual students develop sport skills. Though some drills can be made competitive, primary purpose is skill learning.

Game Play

Application of skills learned during stationary practice and skill drills comprises the bulk of any individual/dual sport unit. Just as students without disabilities need opportunities to apply sport skills, so do students with disabilities. At this level emphasis should be on learning rules and strategies. Class should not be a highly competitive experience. Rather, intramural



activities should be provided for students who wish to play a game in a more competitive form. To facilitate participation of students with disabilities in both class and intramural settings, the following might be helpful--

- Provide lead-up versions of sports to give students chances to develop skills and enjoy participation.
- Emphasize everyone's positive contributions to the game effort--what players can do well, not what they do poorly. Remember, game play is for skill practice.
- In dual sports it may be necessary to remind players to play only their own positions to keep more able or skillful players from monopolizing the game.
- Arrange fairly equal distributions of abilities when assigning partners and opponents.
- Vary number of players involved in a game. Two players on one side can play against one player. This may be useful if one of the pair is mobility impaired and/or if the single player is particularly skilled.
- Assign fairly equal ability players as opponents.
- Use doubles play and assign less mobile students to positions requiring less court or area coverage.
- Develop coaching and officiating as student functions, especially for those with severe physical conditions who may have intelligence and interest in sport but are extremely limited in performances.

Each student in class should be allowed opportunities to play for relatively the same lengths of time. Five minutes of play for one student and all class period for another is neither fair nor instructionally sound. If emphasis is on each student's positive participation, time spent will be both educational and enjoyable.

Specific Individual/Dual Sports

Each specific individual/dual sport presents its own unique opportunities for learning. A good individual sport program contains a variety of activities. All students should be exposed to this variety. Each sport may, however, present different problems to students with disabilities. Some special considerations relative to particular individual/dual sports are discussed in this section.

ARCHERY

- Build up bow grip to make it easier to hold.
- Decrease distance from target.
- Decrease bow weight.
- Adjust bow position to cross bow (bow parallel to ground).
- Modify arrow nock/string to facilitate grasp of string for bow pull.
- Verbally cue student through each step of shooting process.
- Provide assistance in removing arrows from target.
- Provide hands-on assistance for the shooting process by standing behind students and placing hands directly over theirs while shooting.
- Place a sound locator device at the target for easier location by students with visual impairment.

BADMINTON

- Use a bird tethered to an overhead line for initial stroke practice.
- Modify racket grip to make it easier to hold.
- Shorten racket shaft to make it easier to control.
- Lower net during initial skill development.
- Move short serve line closer to net during initial serve development.
- Decrease size of court for initial singles play.
- Teach students with upper extremity amputations to toss the bird and hit it with the same racket arm when serving.
- Use a cuff to attach racket to player.

BOWLING

- Start with stance at foul line, omitting approach.

- Use ball ramp rather than manual release of ball.
- Decrease weight of ball.
- Shorten length of lane by moving closer to pins.
- Provide assistance with scoring.
- Use spring loaded handle bowling ball
- Add stationary support at foul line.
- Arrange equipment with physical barrier between lanes when bowling in the gym.
- Place a sound locator device at pins for students with visual impairments.
- Have a miniature pin set-up available to show students with visual impairments what pins are left standing after the first ball.
- Allow a wheelchair bowler to use a bowling ball holder to hold the ball safely while moving chair to foul line.
- Allow students with minimal arm use to use a bowling stick, an implement constructed out of aluminum with swivel floor guides which remains level for smoother delivery of the ball. The stick pushes ball to pins, much like a shuffleboard stick pushes puck.
- Improvise in gymnasium or classroom with plastic bowling sets or various types of balls and a variety of objects for pins (e.g., plastic pins, milk cartons, cola bottles).

GOLF

- Modify grip area of club to make it easier to hold.
- Select clubs with shorter shafts.
- Learn to swing from a seated position.
- Begin instruction indoors with whiffle golf balls and hitting mats.
- Provide assistance with retrieval of golf balls when practicing outside.

- Start with shortest shots using shortest clubs.
- Place a sound locator device at the cup for individuals with visual impairments.
- Use a cuff to attach club to player.

SELF DEFENSE

- Teach confrontational avoidance based on individual life circumstances.
- Modify information on applying of techniques learned to everyday situations of participants.
- Include techniques for seated individuals.
- Modify techniques to use abilities of individuals. If the only functional body part is the hand, teach techniques using that hand to best advantage. If all a person can do is make a noise, teach how to make the best noise.
- Modify standing position techniques to kneeling starts.
- Include use of disability implements as defense items, swinging a crutch or kicking with an artificial leg, for example.

BEST COPY AVAILABLE

PICKLEBALL

- Modify grip area of paddle to make it easier to hold.
- Reduce height of net.
- Decrease size of court.
- Vary density of ball used. Players with less arm strength and endurance may need a livelier ball. Players having difficulties controlling too much strength may need a dead ball until control is learned.
- Increase size of paddle surface.
- Use a cuff to attach racket to player.
- Reduce length of paddle handle.
- Allow more than one bounce during game play.

TABLE TENNIS

- Use two handed paddle for bilateral use.
- Modify grip of paddle to make it easier to hold.
- Add sides to table to help keep balls in playing areas.
- Modify height of table to accommodate wheelchair participants.
- Increase paddle face size.
- Provide assistance for retrieving balls on floor.
- Use a cuff to attach the paddle to the player.
- Play without a net.
- Replace net with ropes or strings.

- Support paddle from overhead bracket attached to wheelchair.

TENNIS/RACKETBALL

- Modify grip of racket to make it easier to hold.
- Increase size of racket head.
- Shorten length of racket shaft.
- Decrease weight of racket.
- Change density of practice balls. Students with little arm strength may benefit from use of a livelier ball.
- Lower height of net.
- Decrease size of playing area.
- Use a bounce and hit to put ball into play rather than regular serve.
- Use a cuff to attach racket to player.
- Allow more than one bounce.

WRESTLING

- Modify starting position to allow individuals to start on their knees.
- Teach single part positions and take-downs before movement sequences.
- Increase size of wrestling area.
- Be sure all participants have and use a signal which means let go if they get into difficulty and want to end the encounter.

WHEELCHAIR SLALOM

- Use wheelchair slalom as a curriculum alternative when circumstances make it impossible for a student to participate in sport being taught. For example, students severely impaired with muscular dystrophy and using motorized wheelchairs may not be able to participate in gymnastics or wrestling, but would be able to participate in wheelchair slalom.

- Design obstacles utilizing existing physical education equipment.
- Emphasize improving student's own time and accuracy over distance and through obstacles. Many times competition with other wheelchair bound students is not possible.
- Involve students in planning their own obstacles.
- Relate obstacles to physical barrier encounters in real life.
- Allow nonwheelchair bound students to participate in the activity. In this case reverse mainstreaming can not only provide new and different challenges to regular education students, but also increase their sensitivity to mobility problems of their peers in wheelchairs.

Conclusion

Activities and modifications presented here merely scratch the surface of possibilities. There are additional individual sports--billiards, shuffleboard, frisbee, riflery, fishing, skating, hiking, biking--this list is endless. Each can be modified as needed for participation by individuals with disabilities. National sport governing bodies are excellent sources of information as are national publications for the disabled. Individuals themselves often provide best insights on types of modification or adaptation needed, if any. What is needed most are opportunities. Be sure those opportunities are provided in individual sports in your program.

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PRACTICAL POINTERS

PICKLE-BALL[1]

A Fun Court Game for Everyone

Julian U. Stein

"Pickle, what?"

"Pickle-ball!"

"You've got to be kidding!"

Pickle-ball is one of the fastest growing and increasingly popular games throughout the United States--border-to-border, coast-to-coast, and many places between. Pickle-ball is popular with individuals of all ages and athletic abilities--men, women, and children, skilled and nonskilled, athletic and nonathletic. It is great as a family game--as many as three generations can play together--and for mixed doubles in various combinations, including partners consisting of players with and without various disabilities. In addition to being easy to learn and inexpensive to play, pickle-ball can provide a delightfully vigorous workout. This special game is said by some to be more adaptive to skill levels of persons with mild to moderate disabilities than other more traditional games such as tennis, badminton, and volleyball.

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[1] Pickle-ball was invented some 25 years ago in the backyard of former U.S. Representative from Washington Joel Pritchard. In 1965, Pritchard, a friend, and their families improvised a game on a badminton court at Pritchard's Seattle-area home using sawed-off badminton rackets and a perforated plastic ball to replace their damaged badminton equipment. Pritchard's dog, Pickles, liked to run off with loose balls, inspiring a name for the new game.

Pickle-ball can be addictive, and anything but hazardous to one's health. Regardless of past experiences in racquet sports, virtually everyone can develop pickle-ball skills rapidly. Self-satisfaction is almost instantaneous because this is a success oriented game. Shot placement and teamwork are more important than speed, brute power, or strength. Patience, control, and strategy add to success in pickle-ball.

"Ok, you've got me both curious and interested. What is pickle-ball? How do you play? What's needed to get started?"

Court and Equipment

Pickle-ball can be played in close quarters such as driveways, cul-de-sacs, patios, parking lots, small gymnasiums, and most backyards. It has even been played on office building rooftops in Vancouver, British Columbia (Canada). However, the most usual place to find pickle-ball is on existing doubles badminton courts with nets lowered to three feet.

Official court dimensions are 44 feet long and 20 feet wide; the same court is used for singles or doubles. A net 36 inches high at posts and 34 inches in the middle separates the court. Nonvolley zones extend seven feet into each court from the net leaving 15 feet from end of the nonvolley zone to the end line.

The official court (see diagram [2]) is about one-fifth the size of a regulation tennis court. If necessary, court dimensions can be adapted to space available, indoors or outdoors. Do not overlook auditoriums, school or church halls, recreation rooms, and meeting areas as possible sites for pickle-ball.

Equipment needed is minimal--wooden paddles (slightly larger than table tennis paddles), wiffle-ball (hollow, perforated plastic ball slightly larger than a baseball), and net. While there are official pickle-ball paddles and balls (Pickle-ball, Inc., 801 NW 48th Street, Seattle, Washington 98107), any type solid paddle

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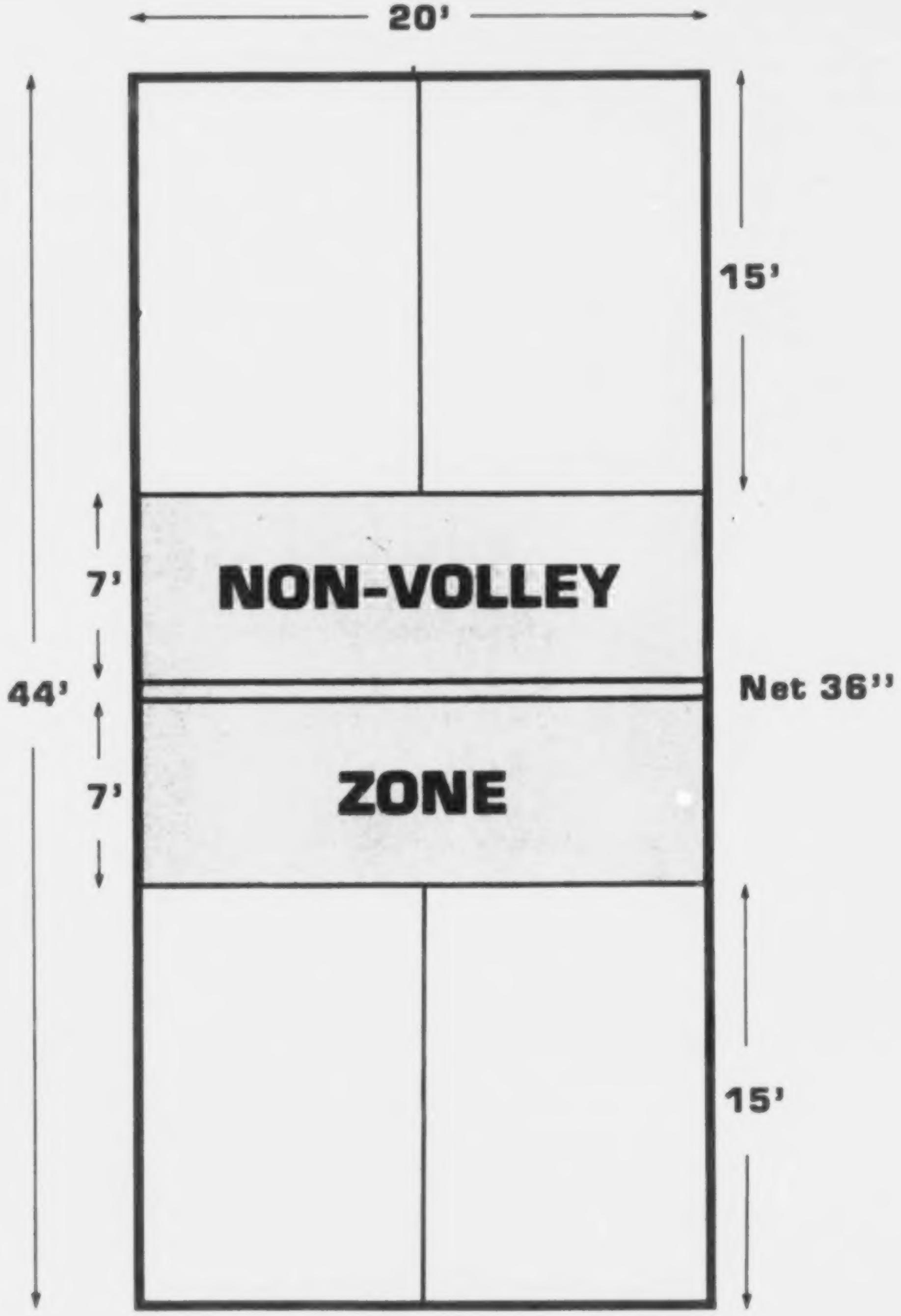
[2] Thanks and appreciation are extended to Doug Smith, president, Pickle-ball, Inc. for permission to use official pickle-ball diagrams in this document.

OFFICIAL PICKLE-BALL® COURT


20'
15'
7'
NON-VOLLEY
44'
Net 36''
7'
ZONE
15'

(e.g., those used in paddle ball or made from three-quarter inch plywood) and small wiffle-balls can be used along with lowered nets on badminton courts.

The Game

The game itself is simple and straightforward to play. An easy underhand serve puts the ball in play--then the real action begins! Ground strokes, lobbing, overhead slams, fast volley exchanges at the net, and passing shots from baselines make this a fun and exciting game that is easy to play; many tennis strategies apply to pickle-ball.

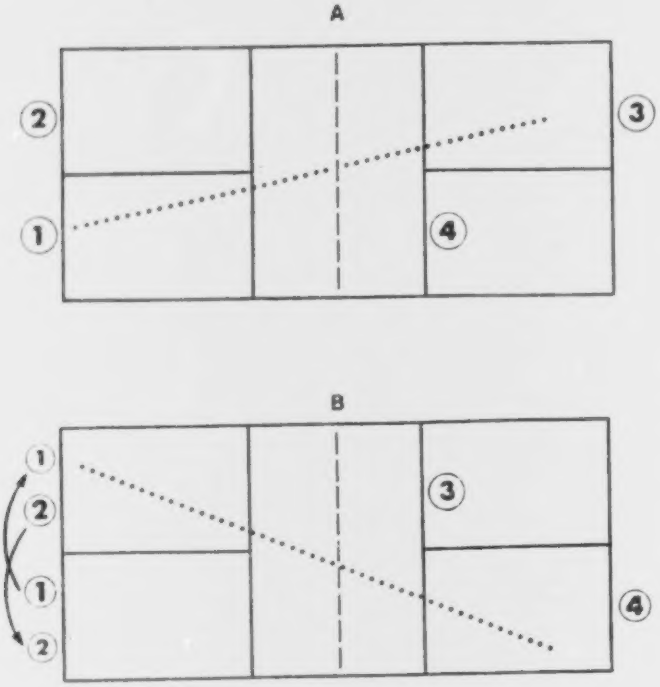
Serve. Player must keep one foot behind the back line when serving. The serve is made underhand with the paddle passing below the waist. The server must hit the ball in the air on the serve, and cannot bounce the ball and then hit it. Service is made diagonally across court and must clear the nonvolley zone. Only one serve attempt is allowed except if the ball touches the net on the serve and lands in the proper service court (like a let in tennis); this serve may be taken over. At the start of each new game, the first serving team is allowed only one fault before giving up the ball and serve to the opponents. Thereafter, both members of each team serve and fault before the ball and serve is turned over to the opposing team. When the receiving team wins the serve, the player in the right hand court always starts play.

Volley. To volley a ball means to hit it in the air without first letting it bounce. All volleying must be done with a player's feet behind the nonvolley zone line. It is a fault if a player steps over the line on the volley follow-through.

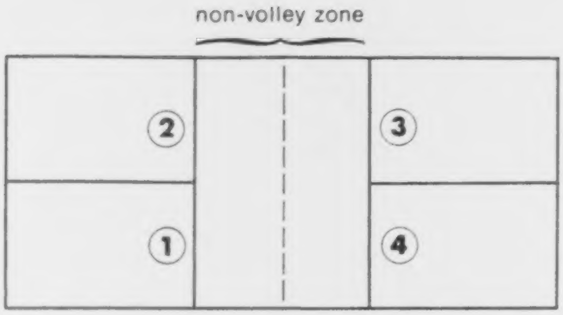
Double Bounce Rule. Each team must play its first shot off the bounce. That is, the receiving team must let the serve bounce, and the serving team must let the return of the serve bounce before playing it. After the two bounces have occurred, the ball can be either volleyed or played off the bounce.

Faults.
--hitting the ball out of bounds
--not clearing net
--stepping into the nonvolley zone and volleying the ball
--volleying the ball before it has bounced once on each side of the net

Scoring. A team scores a point only when serving. A player who is serving shall continue to do so until a fault is made by his/her team. The game is played to 11 points; however, a team must win by two points.


A
2
3
1
4
B
1
2
1
2
3
4

SERVING DIAGRAM


non-volley zone
2
3
1
4

Position of players at net when volleying

VOLLEYING DIAGRAM

Determining Serving Team. Players may toss a coin or rally the ball until a fault is made. Winner of toss or rally has option of serving first or not serving first.

Doubles Play. Player in right hand court serves diagonally across court to receiver in opposite right hand court. If a fault is made by the receiving team, a point is scored by the serving team. When the serving team wins a point, the players switch courts and the same player continues to serve. When the serving team makes its first fault, players stay in the same court and the second partner then serves. When the second fault is made, each stays in the same court and turns ball and serve over to the other team. Players switch courts only after scoring.

Singles Play. All rules apply with the following exceptions--when serving in singles, each player serves from the right hand court when score is 0 or an even number, and from the left hand court when score is an odd number.

General Tips.

--A ball landing on any line is considered good.

--Both members of the serving team should be back near the baseline at the time of the serve so that neither forgets to let the first returned ball bounce before returning it.

--After the ball is in play, lobbing it over the opponents' head can be effective strategy.

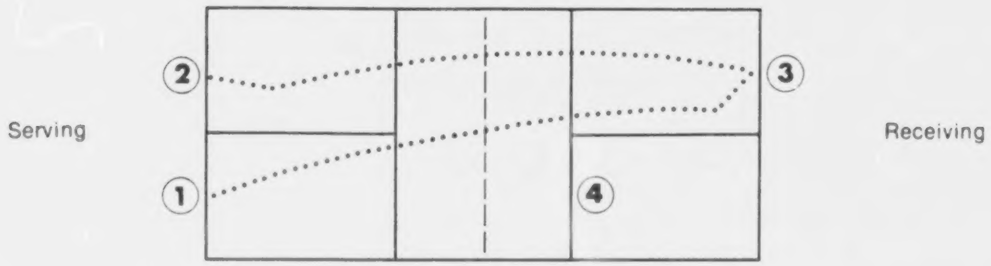
--If a player sees the ball is going to land in the nonvolley zone and it is going to be played on the bounce, move into the zone before it bounces, let it bounce, and then return it.

--The player who starts the game in the right hand court (score 0) will always be in the right hand court when his/her team's score is 2, 4, 6, 8, and 10.

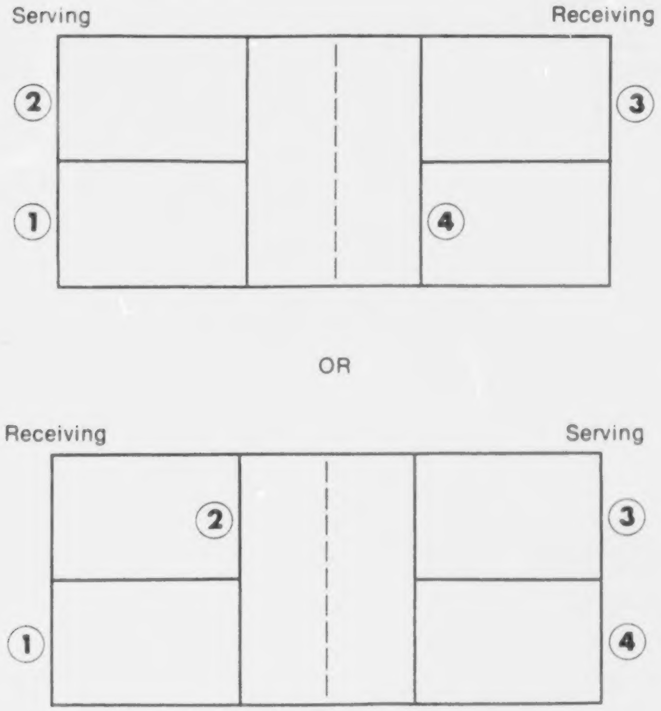
--The hand below the wrist is considered part of the paddle and shots off any part of it are good.

Values of Pickle-ball for Persons with Disabilities

Regardless of handicapping condition, individuals with disabilities can play, be successful, and enjoy pickle-ball. For most, the same values and benefits are possible and accrue as for able-bodied persons--simplicity, adaptable regardless of skill level, exciting, personal satisfaction from success and rapid skill progression, action, play virtually anywhere, economical, and FUN. In addition, pickle-ball is a game that can be played in integrated (mainstreamed) settings with classmates, friends, and family members.


Serving
Receiving
2
3
1
4

DOUBLE BOUNCE RULE


Serving
Receiving
2
3
1
4
OR
Receiving
Serving
2
3
1
4

DOUBLE PLAY DIAGRAM

Adaptations for Players with Disabilities

Pickle-ball can be played with enthusiasm by many people with disabilities, regardless of type and in some cases severity. Often no accommodations are necessary beyond some personalized instruction. Common sense is the key in making necessary accommodations.

For some individuals possessing disabilities, few, if any, modifications or adaptations are needed for them to be successful in pickle-ball--they start right in and get playing. The nature of the game is such that players themselves adapt according to their present skill levels in pickle-ball. Since the wiffle-ball moves slowly, individuals have ample time to see where the ball is going, go to it, and make the return. As skills improve, pace of the game picks up. Through imagination, creativity, and resourcefulness, pickle-ball can be adapted for individuals with similar or dissimilar conditions as well as for play between able-bodied and disabled participants.

As needed, variations of official rules can be introduced, such as--

--Permit the ball to bounce more than once (two, three, or more times) as in wheelchair tennis and wheelchair racquetball.

--Serve from a bounce rather than directly in the air off the paddle.

--Serve from inside the endline, and possibly from as close as the back of the nonvolley zone.

--Make the court smaller than official size.

--Use a large wiffle-ball and/or one that is a bright color (e.g., yellow).

--Lower the net even more than the 36-inch official height.

--Score as in table tennis with each player taking five (two, three) serves and the winner of each play receiving a point.

--Change number of points required for an individual or team to win a game.

Avoid categorical generalizations based on traditional medical diagnoses as bases for determining necessary accommodations for players with various disabilities. Instead, determine how an individual's condition affects ability to learn and play pickle-ball. Then make necessary accommodations.

A basic information processing approach is viable and works well in this process. For example--

For individuals who have problems receiving input of various kinds, use other input senses and/or modify input stimuli so these stimuli can be more easily processed (e.g., include more visual and kinesthetic input for those with hearing difficulties, more auditory and kinesthetic input for those with visual problems; use large and/or brightly colored balls for those with visual difficulties).

For individuals who have problems processing input stimuli, make appropriate and necessary accommodations in teaching procedures (e.g., break skills down into smaller and more manageable bites, introduce skills at lower and more basic levels, incorporate a great deal of positive and specific feedback and reinforcement, use various behavior management techniques, such as chaining and reverse chaining).

For individuals who have problems with actual skill execution because of physical conditions, recognize that they will not execute skills in the same ways as players without such conditions or those with other disabilities. As such, account for many of these differences in skill execution as individual necessities according to the individual's condition. Avoid believing that there is one way, and one way only, to execute each of the skills involved in pickle-ball.

A Final Word

"Well, you've convinced me. Pickle-ball seems to be a great game, and I'm ready to play--let's go."

"Pickles! Bring that ball back right now!"

PRACTICAL POINTERS

PRINCIPLES AND PRACTICES FOR CHAMPIONSHIP PERFORMANCES IN WHEELCHAIR FIELD EVENTS

Just as participation in wheelchair track events has shown dramatic growth in recent years, so has participation in wheelchair field events. Performances are reaching unprecedented distances and accuracies. Specialization in certain field events is becoming more of a necessity for success, especially at national and international levels. Training regimens are becoming more rigorous and vigorous. More athletes are finding weight or resistance training a necessary supplement to practicing skills in specific field events. Many of the same principles and practices from science and sports medicine followed by able-bodied athletes in field events are being adopted and incorporated by athletes taking part in wheelchair field events.

This PRACTICAL POINTER emphasizes general and specific principles and practices for training and competing in wheelchair field events. Hints that can be applied to all field events as well as techniques and approaches for specific field events are presented.

Rgardless of situations, athletes are individuals who respond to different techniques and approaches in different ways. Personal experimentation is necessary to determine the most effective ways to use and apply these practical principles. Continued efforts to improve and refine successful approaches and procedures ensure growth and progress and often distinguish between the also-ran and the champion. Often the only difference between a CHAMP and a CHUMP is U!

GENERAL PRINCIPLES

A number of general principles apply to all wheelchair field events. Other specific principles and approaches apply to individual wheelchair field events. Both general and specific principles must be applied to events in which each individual is participating, combination of events in which the competitor takes part, type and level of handicapping condition, strengths and weaknesses of the individual in each event, level of the competitor, type of competition for which the individual is preparing, and stage of the season. The following general principles apply to all wheelchair field events:

- Do not use weighted implements--shot, discus, javelin, club, ball--in training except for specified purposes in drills and training activities. Weighted implements tend to disrupt smooth, efficient, and effective continuity and flow of movements necessary for optimum performances at any stage of development or level of competition. Added training weights to these implements do not add that much to development of muscular strength and endurance. A well conceived and regularly used weight or resistance training program is the most appropriate and effective way to gain additional muscular strength and endurance, vital to optimum performances at any level of competition. For example, using an eight, twelve, or sixteen pound shot for total put or selected parts of it actually develops entirely different skills than when using the official implement. Additional speed generated with a lighter shot, discus, or javelin does not carry over to regulation implements because of their weight differences.

- Know the number of all out efforts required to reach peak performances as well as timing to reach best performances in each wheelchair field event. While organization and administration of wheelchair field events present some unique problems, this information and these principles need to be applied according to each of these particular situations and specific circumstances. Generally few competitors in wheelchair field events warm-up sufficiently and take an adequate number of all out practice efforts prior to moving into the circle for actual competition. As a result many competitors do not approximate their potentials in wheelchair field events because of failure to give attention to these important details.

  An effective approach to determine effort on which best performance occurs includes--

  1. Determining effort on which best performance occurs.

  2. Planning pre-competition warm-up and all out practice efforts so best effort ideally occurs on second trial in qualifying round; this keeps the third trial in case of a foul on the second trail.

  Next organizers and administrators must provide space for competitors in wheelchair field events to have opportunities for adequate and appropriate practice throws. Competitors must find space for this vital part of their pre-competition ritual whether space is provided or not.

To determine when best efforts occur in a single wheelchair field event--

1. Take twenty-four to thirty all out efforts in groups of three with little rest between sets.
2. Initiate this process only after sufficient length of training to be in competitive condition.
3. Measure and record first efforts and then record how much following efforts are above or below the initial effort.
4. Repeat this pattern once a week for several weeks to determine which effort is best.
5. Adopt a slightly different pattern--do two successive days in one week and repeat in the next week--if it is not possible to carry out the procedure for at least three consecutive weeks.
6. Be sure to use pre-meet warm-up before starting all out efforts, regardless of the number of days the procedure is repeated.
7. Keep a log so that appropriate and necessary changes can be made over the course of a season and from season-to-season.
8. Remember, this procedure must be reevaluated and changed as appropriate from year-to-year and season-to-season.
9. Adapt the approach after getting this information for each event individually and independently for second and third events--whether field or track - on the same day in the same meet.
10. Get this information initially for individual events on different days so results are as accurate as possible for each event.
11. Use numerical averages of best of each twenty-four to thirty efforts when they do not coincide exactly. Watch for other trends and signs--i.e., increasing or decreasing numbers of trials to reach best efforts--to assist in getting the most accurate number of all-out pre-competition warm-up efforts to insure peak performances in competition. Be flexible and ready to adjust slightly according to weather conditions, time in the season, frequency of competition, and personal feelings.

To use this information for competition in meets--

1. Warm-up using meet, not practice, procedures and routines.
2. Take designated number of all out efforts, computing so that the best one occurs on the second trial effort. For example, if best effort averages out on the thirteenth effort, take eleven all out puts or throws before moving into the circle for competing in trials.

3. Be sure to know length of time between completing all out pre-competition efforts and your starting time in the trials.

4. Plan this procedure at meets so that timing is as close to this ideal as possible.

- Recognize that practice and pre-competition warm-ups are not one and the same. Warm-up activities in practice are designed to develop specific physical characteristics--i.e., endurance, strength, agility, balance, speed, power--and correct certain deficiencies in these characteristics as well as to prepare the athlete for all out practice efforts. Warm-ups prior to competition are designed to prepare the athlete for maximum efforts in that competition. Since purposes are different so are activities themselves and length each is done.

- Organize individual practice sessions so that sufficient attention and time are given to working on specific elements of form and technique. Approach this in one of several ways--

    1. Include several or most elements of form in each practice session.

    2. Emphasize one or two elements of form in each practice session being sure that all elements are included over a week of workouts.

    3. Stress elements of form in which needs are greatest and problems most accute.

    4. Incorporate some practice efforts involving the entire form in most all practice sessions.

    5. Insure good and appropriate flow and continuity in form by only moving with completely controlled speed.

    6. Increase speed of movements gradually and only by amounts that can be handled by the individual athlete--nothing causes distances to go down as fast and as much as uncontrolled speed!

    7. Do not go for or be concerned with distance in practice sessions--save these efforts for intrasquad meets and actual competition.

    8. Use appropriately selected and specifically designed drills to improve given aspects of form.

    9. Remember, good form results from intelligent and purposeful practice and brings about peak performances in actual competition.

- Use wall pulleys, Exer-Genies, and other conventional devices to develop flow and continuity of good form, and for correcting form flaws and problem areas in total or specific aspects of coordinated movements in wheelchair field events.

- Have someone observe the athlete's form in both practice and competition so little flaws can be brought to his/her attention and corrections made immediately to make more likely peak performances.

- Use films, sequenced still pictures, Polaroid shots, slides and other graphics of the athlete to assist in both practice and competition. Compare pictures of the athlete when performing especially well with those taken when all is not well. Leave no stones unturned in attaining and maintaining peak performances.

- Develop approaches most appropriate for and effective with individual athletes who participate in more than one field event--

1. Devote one day to one event and the next to the other alternating daily training sessions in this manner.

2. Include some time in every workout for each event.

3. Concentrate on better of events, especially if distances in poorer events are not competitive for the coming meet or next level of competition.

4. Concentrate on the poorer of events, especially if additional work and practice will result in competitive distances for the coming meet, next level of competition, or individuals who participate in the pentathalon.

5. Use combinations of these approaches based on specific and unique needs of each athlete.

- Avoid working with field event implements the day before actual competition. For some individuals, especially when moving into later stages of the season when the big meets are scheduled, it will be advisable to do nothing two--and in some cases three or even four--days before competition. Each athlete must know him/herself so that peak performances are assured.

- Make necessary and appropriate training adjustments when international competitions occur in fall or winter months rather than as natural continuations of regular season competitions followed by state, regionals, and national meets.

- Experiment with different wheelchair field events to find the best and most appropriate one(s) for each athlete based on his/her abilities, interests, types and degrees of impairments.

- Use year round training judiciously and intelligently. Used properly, year round training can assist in personal development; inappropriately used year round training can sap strength and endurance, disrupt form, reduce interest and enthusiasm, and result in declining rather than increasing performances. While this is not now a problem area for many athletes, as specialization in events increases, greater attention will be necessary to appropriate year round training. In year round training attention must be given to weight training, track work, and facilitating form, as well as sometime off to rejuvinate psychologically, revitalize emotionally, and recharge batteries.

- Include some track work in practice sessions for diversity and to insure balance necessary for championship performances.

- Experiment with form adaptations and modifications to determine what is best for each athlete. Without such foresight and willingness to dare to be different and break with tradition, the world would have never known the Fosbury Flop in the high jump or the O'Brien style in the shot!

- Get as much from your body as humanly possible. Turn the chair away from the direction of the trajectory of the implement as much as possible. Increase release force and velocity by having the implement travel the greatest possible distance before actual release. In general, the more trunk and abdominal use, the further back an individual can turn and face. Many individuals of all competitive classifications are coming no where near their potentials because they are facing too much forward and not enough to the rear. Use new technology in wheelchair construction as an ally to get more from your body than you thought possible. A normal hip roll is not considered illegal as long as only one hip and buttock rolls. Be bold and immaginative in your quest for excellence.

- Train when possible with able-bodied field event competitors. While differences between regular and wheelchair field events are obvious, many similarities exist which can be used and incorporated into training and form in wheelchair field events.

- Train to foul!!! Many competitors in wheelchair field events lose distance and come no where near individual potentials because they are afraid of fouling. Often this situation is created by placing too much emphasis on recovery as part of follow-through. As a result, a full release is cut short. By stressing all out effort--following through totally and not worrying about fouling during this important point in the learning process and crucial phase of form--the athlete gets everything into the effort. After all out effort is developed, introduce ways to control direction of the momentum to prevent fouling. For example, this can be accomplished by grabbing the inside front wheel or side arm of the wheelchair or picking an imaginary object from the circle after the implement is on its way with full power. Each athlete must experiment and find the best way to accomplish this according to individual abilities and conditions. Remember, any part of the body may extend over the stopboard in the air as long as no part of the body or chair touches on the board or in the legal throwing area.

- Keep fun in fundamentals.

PRINCIPLES FOR SPECIFIC WHEELCHAIR FIELD EVENTS

Success in wheelchair field events is attained by attention given to many details necessary for perfecting form that insures maximum performances. Each athlete is then more able and likely to use fully his/her abilities and more nearly reach his/her potential. These important factors also provide bases for planning practice regimens designed to capitalize on strengths and imporve weaknesses. When inches can separate a gold medal and not placing, qualifying and staying at home, realizing personal goals and not, no details can be overlooked when striving for excellence.

Factors to consider for reaching goals in wheelchair field events and for evaluating an athlete's form and practice approaches follow.

Shot

Putting the Shot

- The key to putting the shot effectively rests in the formula Power = Force x Velocity. Therefore...
    - ... develop greatest power with greatest speed, and
    - ... get both push and momentum behind the shot.
- Maintain good body position while generating needed momentum for the shot.
- Make sure the putting movement is one continuous motion--once the shot starts forward it must continually accelerate until leaving the putter's hand.
- Let the head turn with the put. Therefore...
    - ... keep the head horizontal except on the follow-through when it elevates, and
    - ... turn the head back at least 45 degrees throughout the put until it starts to turn forward with the putting motion.
- Remember, the greater the distance through which the shot is accelerated, the greater the speed at which the shot is moving on release. This is an application of Momentum = Mass x Velocity^2. Speed is more important than mass.
- Keep the shot on the neck until it is pushed.

Helpful Hints

- Keep the shot low in the hand early in the season to avoid injury.
- Keep eyes and shoulders in the same parallel plane throughout putting movements.

- Keep the elbow directly behind the putting hand.
- Make sure the shot continues to accelerate once it starts moving.
- Use the left arm to get added power at the end of the put (for right handed putters). For some putters, this added leverage is generated by holding onto the arm rest or wheel.
- Concentrate on form in practice; distance then comes in meets.
- **Be prepared for ups and downs of distance, especially early in the** season and by athletes new to the event.

Handhold

- Craddle the shot comfortably on the fingers with the thumb at the side for balance being sure to...
  - ... spread fingers so the shot is on the finger tips;
  - ... keep the three middle or strongest fingers always behind the shot;
  - ... experiment, keeping the little finger behind the shot as a means of generating extra power; and
  - ... spread fingers wider if hands are small.
- Carry the shot above and in front of the shoulder. Let the hand drop back so the wrist is relaxed and cocked--cocking the wrist facilitates the wrist flip at the end of the put.
- Keep the forearm directly under the hand and the shot.
- Keep the tip of the elbow eight to ten inches from the side.
- Be sure the palm of the hand faces direction the shot will travel.
- Allow the hand to drop back to help cocking the wrist.
- Be sure the shot is not in the palm of the hand...
  - ... the shot should be high on the tips of the fingers; and
  - ... beginners will carry the shot a little lower than experienced putters; however, it still should not be in the palm of the hand.
- **Pick the shot up and hold it in the left hand before transferring it to the right hand when ready prior to the put (right handed putters).**

Preparing for the Put

- Strive for good mechanics that include...
    - ... keeping the body and back as erect as possible;
    - ... holding the chin and chest up;
    - ... keeping the eyes parallel to the ground; and
    - ... maintaining the shoulders level with the right shoulder back as far as possible (right handed putters); then raise left arm and shoulder to keep right shoulder down.
- Attain good positions that include...
    - ... holding the shot as discussed in the previous section;
    - ... keeping the right elbow away from the body with the forearm about 40 to 45 degrees to the body; once thrust starts, the forearm stays directly behind the shot; and
    - ... moving the left arm above shoulder height and bending it at the elbow (right handed putters).
- Stay relaxed and loose.
- Keep the center of gravity as low as possible.
- Keep eyes focused on some point on the horizon.
- Remember, optimum angle for release is 45 degrees.
- Avoid going too fast during the early portion of the put.
- Practice from slow to fast to build rhythm, timing, continuity, and synchronous movement.

Put or Thrust

- Put the shot from the shoulder remembering that...
    - ... the shot cannot be thrown--it is against the rules and also hurts the arm;
    - ... optimum angle for release and thrust is 40 to 45 degrees; and
    - ... the right shoulder should be lower than the left shoulder (right handed putters) at the beginning of the putting movement.

- Emphasize upward drive in putting movements in which...
  - ... as much trunk pivot and rotation as possible and legal are generated;
  - ... force of the body turns the head--watch out for the head turning too soon;
  - ... the chin is lifted with the release; a definite counter pull down is provided with the left arm--by keeping the left elbow bent at approximately 45 degrees, this movement is developed in such a way that power to the shot is facilitated (see below for variations); and
  - ... putting action is a lifting action of as much of the body as possible and legal.
- Develop a distinct flip of wrist and fingers at the end of the put--this can add two feet to the put. Remember that...
  - ... fingers should be extended with the palm of the hand down;
  - ... the arm should be fully extended;
  - ... head and chest should be up;
  - ... the back is slightly arched;
  - ... a conscious and audible exhalation is made as the shot is released;
  - ... ideal release angle is 45 degrees; and
  - ... after the shot leaves the hand the putter should reach out and keep the eyes on the shot while it is in flight.
- Variations...
  - ... use the arm opposite the putting hand for leverage by either holding onto the arm rest or wheel; and
  - ... determine degree chair can be turned in circle to get maximum force generated from as much body rotation as possible.
- Remember...
  - ... the legs may not be used to push the body out of the chair. Any light shown between the buttocks and seat of the chair during the throw or immediately after the throw disqualifies the throw. A normal hip roll which occurs in this type of movement is not considered illegal as long as only one hip and buttock rolls.

Recovery

- The sole purpose of this action is as a recovery mechanism that...

  ... does not play a part in the actual put; and

  ... can be used to prevent fouling.

- Pick up an imaginary object from the circle or grab the inside front wheel or side arm of the wheelchair after the shot is on the way with full power if there is a feeling of fouling.

- No additional momentum can be applied after the shot has left the hand since all the power possible for that put has been generated.

Discus

General Considerations

- For individuals who work in both shot and discus--i.e., neither shot nor discus specialists--discus workouts should follow shot workouts. However, if a...

  ... discus specialist, this workout should come first;

  ... shot specialist, this workout should come first.

- A major objective in the discus is to accelerate the implement from its start until it leaves the hand. Remember...

  ... if individuals slow down or stop, they have wasted all movements and actions preceding that point; and

  ... often by trying to accelerate too fast in the early part of the throw, athletes are forced to slow down to maintain control.

- The objective of the discus is to integrate linear and circular motions.

- When using a wooden discus, always throw with the same side up so as to have the best possible hand surface.

- Speed of rotation is important; controlled speed of rotation is more important.

- To become proficient in throwing the discus...

  ... develop an effective handhold;

  ... learn the release--sailing the discus easily;

  ... establish an efficient delivery;

- ... work always slow to fast striving to master form, technique, rhythm, coordination, and continuity;
- ... work on a specific skill on every practice throw; and
- ... work on only one skill at a time.

- Make sure the first throw in competition is fair and good as far as distance is concerned.
- Change position in the circle to take full advantage of wind.
- Never try to throw the discus a mile or out of the stadium--this destroys rhythm, timing, continuity, and results in poor throws; concentrate on form and good throws result.

Handhold

- Size of the hand and length of fingers affect grip on the discus. Regardless of these factors, certain fundmentals are important and must be followed.
- Fundamentals of the handhold emphasize...
  - ... keeping the palm of the hand down;
  - ... holding the discus flat against the palm of the hand;
  - ... keeping the first joint of each finger over the edge of the discus to hold it firmly.
  - ... Spreading the fingers slightly and spacing them evenly on the discus--in some variations (see below) this is changed to accommodate hand size;
  - ... pressing the thumb flat against the discus;
  - ... extending the thumb in line with the forearm but not over the edge of the discus;
  - ... having the thumb make an angle of about 45 degrees with the forefinger; and
  - ... keeping the hand directly over the center of the weight of the discus or slightly behind the center.
- Variations of the fundamental handhold include...
  - ... spreading the fingers more;
  - ... applying pressure differently; and/or

- ... humping the wrists for athletes with small hands who arch or cup their hands and wrists so lobes at bases of the fingers do not touch the discus; back of the discus rests lightly on wrist and lobe of the thumb; thumb rests on the face of the discus close to the index finger; no other parts touch the discus; the hand is turned slightly to the right (right handed thrower) so more snap can be developed.

- Place the top edge of the discus against the inner side of the wrist.

- Cover as much of the discus as possible with the hand.

- Cock the wrist to the right (right handed thrower) for greater snap on release.

- Press the edge of the discus lightly but firmly against edges of the fingers--do not grip the discus with the fingers.

- Develop centrifugal force to keep the discus in proper place--correct handhold insures this.

- Get so that the discus can be planed...

  - ... the discus has a clockwise turn or spin (right handed throwers); and

  - ... the discus should go off the (1) forefinger alone, (2) forefinger and middle finger together, or (3) forefinger and middle finger which are held together for greater power.

- Be sure to...

  - ... use towels to keep discus dry and clean;

  - ... use firm grip on hands to keep discus from slipping, and

  - ... tape wrist for protection and to aid proper wrist action.

Preparing for the Throw

- The athlete must be in a semi-relaxed position.

- Preliminary swings of the discus are for control, relaxation, rhythm, and balance.

- At the end of the last preliminary swing (right handed throwers)...

  - ... eyes and head are turned to the right to give a longer arc for the backswing of the discus;

  - ... right hip is back and cocked as much as possible and legal;

- ... eyes are focused at or slightly above the horizon;
- ... eyes are important since they pilot movement of the body;
- ... left arm is extended or partially flexed;
- ... left arm is a counter weight for balance;
- ... rotation of preliminary swings is backward and sideward to the right and then forward and sideward to the left; and
- ... the discus from this point on trails through the entire throw.

. Variations for Classes 1A, 1B, 1C, II may include holding on to the wheel or the side arm with the opposite arm to aid in adjusting balance. Thrust motion is the same, perhaps dropping the arc slightly before release; follow through is with the arm and shoulder rather than with the body.

Delivery

. The body turns the arm--to the maximum degree possible--and brings the discus through with it; for this reason the discus continues to trail throughout the throw.

. An improper delivery position costs many feet.

. Beginning the delivery...

- ... pull on the discus; start from a position when the discus is well to the rear of the body; pull is coordinated with the swift twist of the trunk to the left (right handed thrower); the discus starts through from as close to hip level as possible;
- ... head is tilted back;
- ... eyes are lifted and focused on a point above the horizon; and
- ... trunk straightens out to maximum extent possible and legal.

. Flow of the throw (right handed thrower)...

- ... right hip to left hip to degree possible and legal,
- ... right shoulder to right arm;
- ... right arm to right wrist;
- ... right wrist to right hand;
- ... right hand to fingers; and
- ... pull back with left side.

- Important pointers of the delivery...
  - ... hips rotate forward to degree possible and legal;
  - ... chest is up;
  - ... discus trails behind until it actually starts to come through;
  - ... momentum turns the body to degree possible and legal which in turn moves the discus;
  - ... throw through the shoulder; and
  - ... use left arm to give added force to the throw by pulling vigorously down.

Release

- A good release adds at least ten feet to total distance...
  - ... the discus should sail without a wobble;
  - ... a wobbling discus increases air resistance and reduces distance; and
  - ... release should be at an angle between 28 and 45 degrees according to weather conditions--reduce angle of release into a head wind and increase angle of release with a trailing wind.
- In an effective release...
  - ... the discus should leave the hand about shoulder level -- the throw comes through the shoulder;
  - ... the discus comes off the fingers in such a way that it spins clockwise (right handed thrower);
  - ... the conventional release is off the forefinger;
  - ... variations in release include off the forefinger and/or middle finger;
  - ... final contact with the discus is at a point slightly ahead of an imaginary line drawn through both shoulders;
  - ... the chest must be upward and forward;
  - ... the head is tilted slightly back with eyes focused on the flight of the discus;
  - ... the left arm swings vigorously back and down to add power to the throw;

- ... at the time of the release the shoulders are turned to the front and are about parallel to the ground;
- ... hips are square, with the right hip rotated to the front to degree possible and legal;
- ... a definite and conscious snap of the wrist at the end of the throw gives extra power;
- ... the discus actually comes off the front of the hand;
- ... actual release is at shoulder height; and
- ... wrist is in a straight line with the discus as the implement comes off the fingers.

Recovery

- This is not an actual part of the throw--it helps the thrower not to foul and to regain balance.
- Keep the head back with eyes focused toward the direction of the flight of the discus.
- Use arms in the most natural and best ways for effective recovery action--this is a highly individualized procedure.
- To prevent fouling...
  - ... turn back into the circle to degree possible and legal;
  - ... look at feet or rear wheels on wheelchair; and/or
  - ... pick up an imaginary object from the circle or grab the inside front wheel or side arm of the wheelchair after the discus is on its way with full power.
- Follow through may bring the body well over the arm of the chair with a roll-over motion of the buttocks. No light should be visible between the seat of the chair and buttocks of the individual; a normal hip roll is legal.
- Legs may come off the footplates after the throw. Falling out of the chair after the throw and touching the ground in the circle is permitted; out of the circle is a foul throw.

Safety Precautions

- **Have separate facilities for discus throwers to practice if at all possible.**

- Have spectators and individuals returning the discus stand at least thirty feet beyond the point to which the discus can slide or bounce after hitting.
- Make certain no one is within range before throwing.
- Make sure that in meets the area is clearly marked and roped off to prevent spectators and other competitors from moving through the area.

Javelin

Grip

- Grip at the rear end of the cord binding to allow force to be transmitted to the javelin behind its center of gravity, and so the fingers find good resistance on the javelin shaft.
- Keep the thumb and last two joints of the index finger behind the cord binding so the javelin is positioned along the inner edge of the palm of the hand; this affords a good power throw.
- Be sure the thumb and last two joints of the middle finger are behind the cord binding while the index finger supports the shaft from below. The other fingers may curl over the cord binding or dig into the side of the cord binding.
- Remember, a somewhat longer and stronger lever is offered by the middle finger--this is beneficial to the spin of the javelin about a long axis which is so important to flight stability; the index finger on the javelin shaft has better possibility of controlling the throw.

Preparing for the Throw

- Place the javelin at the height of the forehead, above the shoulder, and parallel to the ground.
- Extend the throwing arm back as far as comfortably possible without strain and in alignment with the shoulder axis.
- Turn the palm of the hand upwards and extend the forearm.
- Attain as much backward lean as possible since this is so important for sustained application of force during the release.
- Remember...
    - ... the wheelchair may face the stop board or be turned sidewards.
    - ... Classes 1A, 1B, 1C, and 11 usually face the stop board with the opposite hand holding onto the side arm or the wheel.

- Classes III and IV may place the large wheels against the stop board and sit towards the front of the chair to gain more leverage for throws. This position, however, may cause the buttocks to come off the seat.
- Class V may place the chair in any position that is good for the individual. The side position generally is better for maximum follow through after the throw.

Throwing Motion

- Master overhand throwing motion which is basic to good javelin technique. Length of the javelin complicates developing an effective overhand throwing motion.
- Develop explosive force of arms and shoulders that is so important in basic overhand throwing motion for the javelin.
- Use balls, broom sticks and wooden dowels of different lengths and short javelins to develop and apply basic overhand throwing motion to throwing the javelin.
- Master basics of overhand throwing with the javelin itself, always using just the right amount of speed--a key to success is controlled speed.
- Throw so the javelin first touches the ground with the tip of the metal head as prescribed by rules. The final wrist snap is important to get the javelin to land point down.
- Flow of the throw...
  - bring the arm forward;
  - bend the arm at the elbow;
  - draw the hand near the head as the thrust forward is made; and
  - snap the wrist down as the release is made with a follow through.

Release

- Keep shoulder and hip axis parallel and abreast at right angles to the direction of the throw.
- Remember, the throwing arm is still well bent and does not extend again until the appropriate time in the throwing motion.
- When the throwing arm begins to move forward, the elbow is raised until it is level with the head and pointed in the direction of the throw; lower and upper arms form a right angle.

- Keep the left side of the body (right handed thrower) fixed to the maximum degree possible.

- Strive for an angle of release between 32 and 36 degrees. Keep the angle of incidence of the javelin--the javelin forms one arm and the ground the other arm of the angle--as near the angle of release as possible. The ideal is when angles of release and incidence are identical. The higher the angle of incidence, the greater the surface of the javelin exposed to the flow of arc and the greater the effect of the wind on flight and trajectory of the javelin.

- Complete the release with a snap down of the wrist to insure effective follow-through.

Precision Javelin

Basic Fundamentals

- Use same basic grip as in regular javelin.

- Have chair face the throwing line, although it may be turned sideways.

- Use high arching throw which is usually better for accuracy needed in hitting the ground target. Some individuals, however, may want to try the direct straight-line throw.

- Use hand and arm not holding the javelin to sight the target by holding the arm straight out towards the target and sighting over the hand.

PENTATHLON

The wheelchair pentathlon, a test of versability, strength, endurance, speed, agility, power, coordination, and overall athletic ability, is separate from competition in individual events. The wheelchair pentathlon consists of--

- Archery--48 arrows at 50 yards; Classes 1B, 1C, and II, 25 yards.

- Swimming - Classes 1B, 1C, and II--25 yards; Classes III and IV-- 50 yards; Classes V and VI--100 yards.

- Javelin--Class 1B uses a club rather than a javelin.

- Shot--Class 1B--2 kilogram shot; Class 1C and all females--3 kilogram shot; Classes II, III, IV, and V--4 kilogram shot.

- Dash--Class 1B--60 yards; all other classes--100 yards.

Since athletes prepare to compete in five events, there is little chance for specialization in any one event. Practice daily, using drills, warm-ups, fundamentals, and activities appropriate for individual events. Practice patterns vary according to available facilities, time in the season, strengths and weaknesses of individual athletes, experience of athletes in various events, strengths and weaknesses of opponents. Some guidelines to consider in planning practice sessions include--

- Work on one field event and the sprint event in an individual practice session; emphasize aspects of each event in which the athlete is weak--form, endurance, speed, start, finish, approach. Practice swimming on a day reserved for this event. Integrate archery into workouts so that it receives adequate attention and fits most appropriately into the overall practice pattern.

- Pick one day, preferably Friday or Saturday, for time trials, intrasquad competition, or practice meets in all five events. This helps develop the kind of endurance and timing needed to compete in the pentathlon.

- Emphasize weak events by having athletes perform all five events as in competition and then spend the rest of the day's practice time equally on the one or two weakest events.

- Spend additional time on weak events by allocating more practice sessions per week for these events.

- Develop a coordinated practice plan for the season as well as month-to-month, and week-to-week. Keep this plan flexible so that it can be adjusted as conditions change during the season and individual athletes require different practice emphases.

- Emphasize events in which the individual has least experience when he/she competes regularly in specific events in individual competition and needs additional time in the relatively new events.

With the wheelchair pentathlon scoring system decisions have to be made as to whether or not to concentrate on an individual's weakest events, emphasize fair events, and maintain performance levels in strong events. The reason to consider this approach is simple--the more an individual improves weak events, the better chances of improving relative position in competition. It is usually easier to improve and gain points in weak than in strong events.

Another consideration is the individual's potential for improvement in each event. For example, an athlete who has sprinted a great deal but put the shot or thrown the javelin little usually improves more in field events that in the sprint. Similarly, characteristics of archery and swimming events are such that more rapid and greater improvement can be realized by individuals who are attracted to the pentathlon through track and field activities. Further, events like sprints and the shot are subject to performance plateaus or leveling off. Planning pentathlon practice sessions is a complicated and complex procedure in which each competitor's performance patterns, experience, and abilities must be considered.

The pentathlon is a demanding event--five activities in one day. It is not easy to get competitors in condition for competition while making training and practice fun, interesting, exciting, and challenging. Use games, relays, activities, drills appropriate for individual events and motivational devices used with other athletes in other events and activities to stimulate individual athletes to peak performances.

PRACTICAL POINTERS

PRINCIPLES AND PRACTICES FOR CHAMPIONSHIP PERFORMANCES IN WHEELCHAIR TRACK EVENTS

> Fight one more round. When your feet are so tired that you have to shuffle back to the center of the ring, fight one more round. When your arms are so tired that you can hardly lift your hands to come on guard, fight one more round. When your nose is bleeding and your eyes are black and you are so tired that you wish your opponent would crack you one on the jaw and put you to sleep, fight one more round--remembering that the man who always fights one more round is never whipped.
>
> James J. Corbbett

Interest and participation in wheelchair track and field are at all time highs and growing. Opportunities are increasing for both sexes, individuals of all ages, and participants with every type, level, and degree of handicapping condition.

Federal legislation gives special attention to opportunities in extracurricular activities, including intramurals, extramurals, and interscholastic and intercollegiate sports, for individuals with handicapping conditions. A golden era for wheelchair sports is upon us. Physical education, recreation, and sports programs of all types and descriptions and at every level will continue to grow and numbers of participants will increase dramatically.

This PRACTICAL POINTER is designed to assist participants at whatever level each takes part, as well as coaches, physical education teachers, adapted phpysical education teaching and resource specialists, recreation leaders, therapeutic recreation personnel, volunteers, and others directly involved in wheelchair track.

BASIC PRINCIPLES FOR CHAMPIONSHIP PERFORMANCES

Listings of previous winners and record holders in wheelchair track events reveal many of the same individuals dominating various events--sprints, middle distances, and long distances. As numbers of participants continue to increase in wheelchair track, greater specialization will be evident and necessary just as in track events involving able-bodied athletes. Physical and emotional characteristics, psychological approaches, and training emphases differ from event-to-event. Although specific differences exist among various wheelchair track events, a number of basic and fundamental principles apply and should be used by everyone regardless of competitive distances or combinations of events:

- Establish (1) season goals and (2) intermediate objectives for every event in which an individual athlete participates. Such direction provides bases for determining paces and training times for workouts and practice sessions. Intermediate objectives are established according to times key meets are scheduled throughout the competitive seasons. Both season goals and intermediate objectives must be periodically reviewed and adjusted up (faster) or down (slower) in terms of times in actual competition and progress during training workouts and practice sessions. Goals and objectives must be designed to challenge the individual athlete, make him/her reach and stretch, and bring out every ability in the competitor.

- Keep a personal log which includes (1) warm-up activities and how each specific activity and combination make the individual feel, (2) season goals and intermediate objectives, (3) information about training workouts and practice sessions, (4) pace splits from competition, (5) times from training workouts and practice sessions, (6) information about opponents, and (7) any other information to help the athlete perform better and more effectively.

- Experiment with different warn-up patterns and approaches until the best and most appropriate one for the individual athlete is determined. Continue to experiment with slight modifications in warm-up procedures so that they become even better and more effective for the individual.

- Determine how warm-up patterns and approaches differ for practice and competition in terms of (1) specific activities, (2) repetitions, and (3) timing. Practice warm-up routines include stretching and flexibility exercises as well as strength and endurance activities, form work, and emphasis on special needs of each athlete. Pre-meet warm-up routines and approaches include few if any strength and endurance activities, and place more emphasis on preparing for actual competitive events.

- Include in pre-meet warm-up routines and approaches every element within competitive events--practicing form, starting, sprinting, pacing, fighting off competitive challenges, and finishing in addition to initial basic warm-up activities.

- Be sure to re-warm-up prior to semifinals, finals, and/or second and third events when doubling or tripling in a meet. Too often insufficient attention is given to this important factor for insuring peak performances when competing more than once in a meet. Wear sweatshirts, stay out of the sun and remain in the shade between events to conserve body heat and avoid sapping effects of the sun.

- Recognize that doubling down--going from longer first to shorter second events--is more easily accomplished than doubling-up when taking part in more than one event in a meet; this is a more important consideration for middle and long distance events than for sprints. When differences in psychological and emotional preparation for each event are considered, appropriate double combinations become even more crucial for championship performances.

- Use movies, films, pictures, and other visual aids to help athletes see elements of good form; demonstrate and let other members of the squad serve as models.

- Include weight or resistance training as both an off and regular season supplement to basic training in track events. Be careful as to how and when weight is added to a wheelchair since this can disrupt pace judgment so vital in middle and long distance events. See Practical Pointer, Volume II, Number 6--Weight Training for Wheelchair Sports--for specific information about this training technique.

- Plan individual training workouts so that distances get shorter in each practice session. By funneling-in components of individual workouts, athletes are better able to deal psychologically with different distances and continue to exert efforts needed for maximum benefits from every element within each practice session or training workout.

- Develop workouts and practice sessions within each week so distances get longer and closer to that of the athlete's primary competitive event as the week progresses. In this way participating in the primary competitive event becomes the focal point for each week's workouts. Plan these workouts so each athlete's primary competitive distance is only done in actual competition--save these efforts for meets; don't leave championship performances in practice!

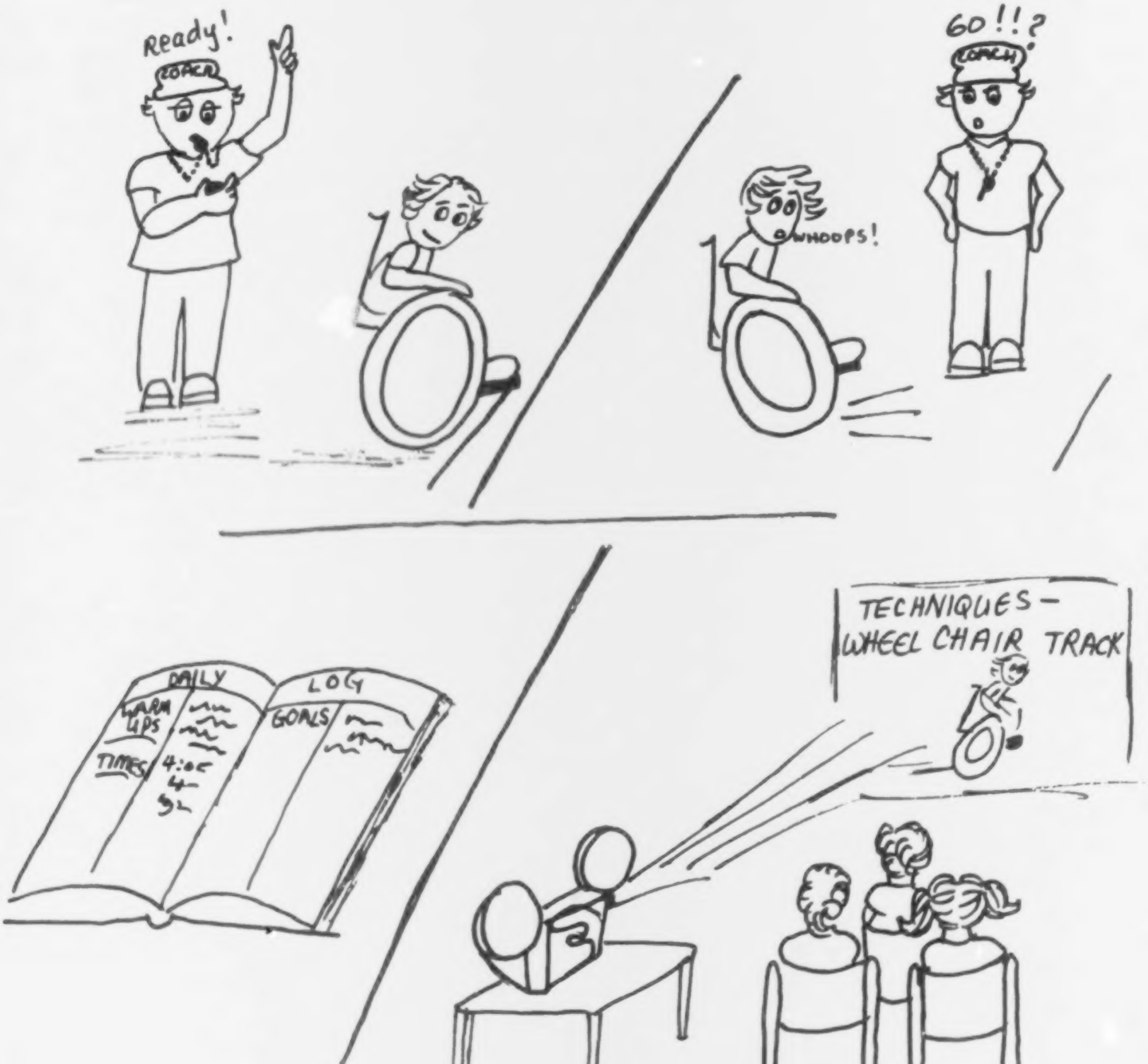
- Be sure an ample amount of practice is done in a clockwise direction so that an equal balance is maintained between right and left arms; this is especially important for competitors who must go around turns.

- Emphasize quantity of work during pre and early season; gradually give more attention to quality of work in mid and late season. As dates for key meets approach, practice times should never be slower than pace anticipated for actual competition in a specific meet. Workouts and practice sessions are built around partial distances done at pace or faster. Use speed work as a means of preparing for fast times in competition.

- Plan a race, then race the plan. Have a strategy for each competitive effort that takes into consideration time in the season, type and importance of the meet, distance, pace, personal condition, number in the race, finals or qualifying heats, and information about opponents--how each paces him/herself, competeiveness, physical condition, respones to challenge and ability to kick. While an athlete must be conscious of desired and actual pace for each race, he/she must also be race conscious. Contact with other competitors is vital, especially the closer the abilities of competitors and the nearer the finish line approaches. An athlete must know when to abandon a race plan and go for broke; every athlete must know when to gamble and when to be conservative and remain with a race plan.

- Concentrate on only one thing at a time in practice and in competition--minds function more effectively and efficiently in this way. This approach enables an athlete to concentrate on specific needs in practice and strategy during competition. Elements of good form and pace knowledge become automatic by developing appropriate habits in practice. In a given workout an athlete can concentrate on numerous needs, but only one at a time.

Remember, good wheeling is an accumulation of much wheeling--practice does make perfect.


Ready!
COACH
GO!!?
COACH
WHOOPS!
DAILY LOG
WARM UPS
GOALS
TIMES
TECHNIQUES -
WHEEL CHAIR TRACK

TYPES OF WORKOUTS

Success on the track in a wheelchair requires more than going out and turning a few laps. A comprehensive program leading to championship performances requires a variety of workout approahces and practice patterns. Even though each of the following types of workouts is designed for specific purposes, individual athletes must determine through use how and why he/she can benefit most from them.

Interval Workouts

Interval workouts can be used for various purposes--strength, endurance, pace, rhythm, speed. Ways in which interval workouts are structured determine their purposes and desired benefits for athletes. Interval workouts are timed on a track or over an exactly measured course. Five variables make this a very adaptable and flexible type of training procedure--

- Distance over which athlete is timed.
- Time at which the distance is covered.
- Repetitions or number of times the distance is covered at the specified time.
- Time between repetitions. Some individuals separate repetitions by moving slowly through the distance over which they have just been timed. However, timing rest intervals makes for more exacting workouts.
- Activity during rest interval. Slow, continuous movements are better and more beneficial than simply sitting and waiting for the next repetition.

Speed Play

Speed play, done off the track and without timing, adds an informal, different, and enjoyable training procedure. Interval principles are incorporated and applied as an athlete controls his/her workout according to the way he/she feels.

The basic idea of speed play is to become accustomed to going faster and further than required in a race without getting tired. When tired, move very slowly for a few minutes and then pick up the program again. However, don't use this as a crutch on which to justify stopping--you can keep on going even though you might not think you can. Mental attitude is one of the biggest parts of championship performances in wheelchair track; speed play is not an easy way to become good in track; it is another method to help in the overall program. To become successful in wheelchair track, hard work is a necessity. Good wheelin' is an accumulation of a lot of wheelin'!

Speed play consists of...

...easy wheeling for ten to fifteen minutes as a means of warming up. In the early season, however, warm up by using exercises with special emphasis upon strengthening abdominal muscles and preparing arm muscles for hard work.

...steady hard speed--faster than usual pace--for 3/4 to 1½ miles (as the season progresses this should be increased to 1 to 1 3/4 miles). At all times make sure that good form is emphasized. Pick different areas for workouts--enjoy yourself.

...easy wheeling for five minutes.

...easy wheeling with three to four quick movements at least twice per minute. These quick movements are like sudden speeding up during a race to fight off a challanger who is trying to pass or to pass another competitor. This is called a check out which is similar to a quick but short sprint.

...some full speed up hill sprints at least every five minutes. This entire process--check outs and hill work--should last ten to twenty minutes.

...fast pace carried for one minute. This should be repeated until the end of the speed play or practice session. After the fast pace move easily until the next one. Rest periods should not exceed one to two minutes. Athletes should feel stimulated rather than tired at the completion of this phase of the workout.

...pace work on the track if designated.

Reminders--

- You got out of speed play just what you put into it--the more put into it, the more benefits that are derived.
- Speed play is an excellent type of workout for a weekend or when extra work is needed.
- Speed play is the type of workout that great distance runners of the world credit with making them successful--make it part of your road to success.
- Speed play can be even more effective when two or more squad members work together.
- To add interest, include such variations as back to front, follow the leader, foxes and hounds, tag, and other games that you may invent as long as main phases of the workout are included.

Distance Workouts

Distance workouts are done off the track--on roads, in streets, through woods, on all weather accessible paths--and without being timed. Distance workouts are used a great deal in preseason training to help build a solid foundation through the accumulation of a great deal of mileage. Long continuous distance work, including as much hill work as possible, is not generally used more than once a week, and then early in the week. Since this is not a timed workout the principle of increasing distances through the week does not apply. A distance workout is an appropriate approach when physically sore or psychologically drained during pre and early seasons. During any part of the season distance workouts can be used the day after a particularly hard or trying meet. However, speed play workouts can accomplish many of the same things as distance approaches but in more interesting, appealing, and adaptable ways, especially when preparing for specific meets during the track season itself.

Rhythm Workouts

Rhythm workouts are designed so that a stipulated pace is maintained for various distances. For example, a 6:00 miler would strive for 3/4 mile in 4.30, ½ mile in 3.00, 440 yards in 90 seconds, 220 yards in 45 seconds, 110 yards in 22.5 seconds, and 55 yards in 11.25 seconds. Combinations and times must be adjusted to fit needs of each athlete in terms of distances, times, repetitions, and rest intervals. This rhythm approach can be applied for athletes competing at any distance.

Pace Work

Pace work at different distances is vital for developing an internal stopwatch on the part of an athlete. Only so much energy is available for an athlete to expend in any race at any distance. Despite ways in which many competitors split times, even pace--distributing energy equally over a race--is the most economical and effective approach. However, individual differences in distances, abilities, confidence, experience, opponents, and races themselves can result in slight deviations from exact even pace for some competitors in specific meets. Generally the longer the distance the more important even pace for optimum energy utilization.

INTEGRATING MEET AND PRACTICE TIMES FOR EVEN PACE ONE MILE*

			Times for practice intervals of --		
	Mile Time	Average 440 yard Time	440 yards	880 yards	3/4 mile
Meet time	6:00	90 sec.			
New goal	5:48	87 sec.	86 sec.	2:54	4:21
Meet time	7:12	1:48			
New goal	7:00	1:45	1:46	3:30	5:15
Meet time	8:00	2:00			
New goal	7:48	1:57	1:56	3:54	5:51

Rules of Thumb:
(1) Keep each 440 at same speed in meets
(2) Keep interval 440's 4 sec. faster than average 440 time in previous meet's timed mile--this will be 1 sec. faster than average 440 time for new goal.
(3) Keep interval 880's and 3/4 miles so that each 440 is 3 sec. faster than average 440 in previous meet's timed mile.

*Times expressed in seconds or minutes and seconds.

PACE GOALS

Mile Goal	3/4 Mile	880 Yards	440 Yards	220 Yards	110 Yards	55 Yards
12:00	9:00	6:00	3:00	90	45.0	22.5
11:48	8:48	5:52	2:56	88	44.0	22.0
11:30	8:36	5:44	2:52	86	43.0	21.5
11:12	8:24	5:36	2:48	84	42.0	21.0
10:56	8:12	5:28	2:44	82	41.0	20.5
10:40	8:00	5:20	2:40	80	40.0	20.0
10:24	7:48	5:12	2:36	78	39.0	19.5
10:08	7:36	5:04	2:32	76	38.0	19.0
10:00	7:30	5:00	2:30	75	37.5	18.75
9:52	7:24	4:56	2:28	74	37.0	18.5
9:36	7:12	4:48	2:24	72	36.0	18.0
9:20	7:00	4:40	2:20	70	35.0	17.5
9:04	6:48	4:32	2:16	68	34.0	17.0
8:48	6:36	4:24	2:12	66	33.0	16.5
8:32	6:24	4:16	2:08	64	32.0	16.0
8:16	6:12	4:08	2:04	62	31.0	15.5
8:00	6:00	4:00	2:00	60	30.0	15.0
7:44	5:48	3:52	1:56	58	29.0	14.5
7:28	5:36	3:44	1:52	56	28.0	14.0
7:12	5:24	3:36	1:48	54	27.0	13.5
6:56	5:12	3:28	1:44	52	26.0	13.0
6:40	5:00	3:20	1:40	50	25.0	12.5
6:24	4:48	3:12	:96	48	24.0	12.0
6:08	4:36	3:04	:92	46	23.0	11.5
6:00	4:30	3:00	:90	45	22.5	11.25
5:52	4:24	2:56	:88	44	22.0	11.0
5:36	4:12	2:48	:84	42	21.0	10.5
5:20	4:00	2:40	:80	40	20.0	10.0
5:04	3:48	2:32	:76	38	19.0	9.5

Times expressed in seconds or minutes and seconds.

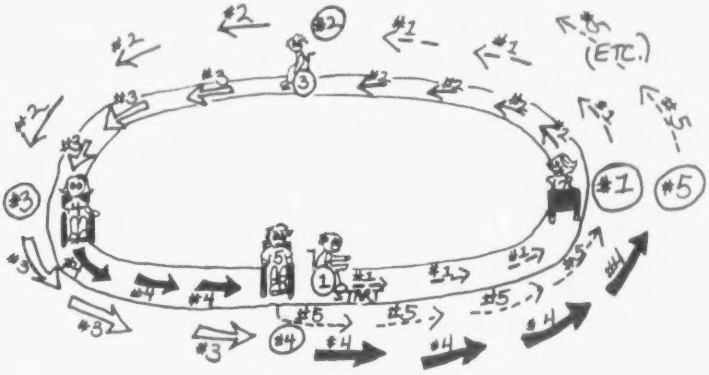
Rule of thumb for accelerated rhythm workouts--run 3/4 mile slower than pace, 880 yards at pace, and all shorter distances faster than pace--note example ☐ for 6:00 miler; apply this principle to other distance combinations according to needs and condition of individual athletes.

Rhythm workouts consist of different distances run at a consistent pace as shown ○ for a 7:12 miles. Partial times can be used for interval or pace workouts.

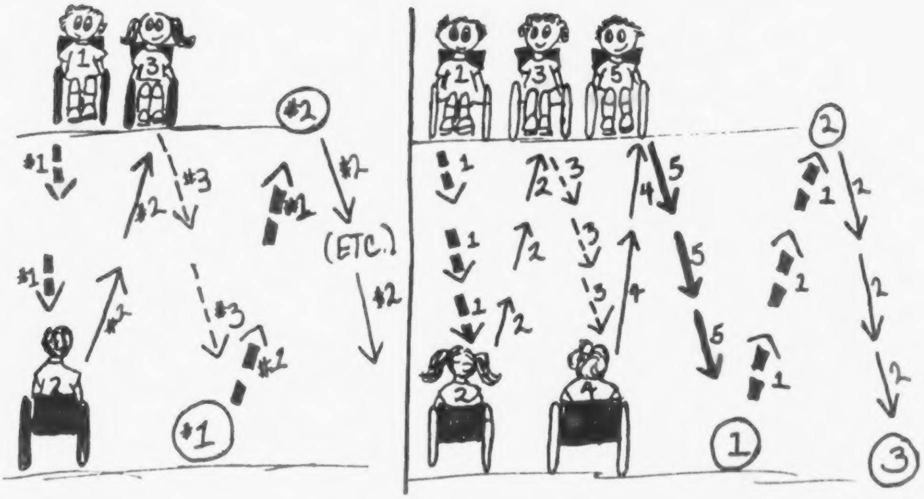
Speed Work

Speed is the key to championship performances regardless of distance. As distances increase, the longer time fast speeds can be maintained, the better the performances. Speed is important for developing fast starts, fighting off challenges, and attaining good finishing kicks even though in some instances good finishing kicks represent individuals who simply slow down least. Many different ways can be used to develop the all important speed ingredient--

- Wind sprints--sprint full speed various distances--20, 25, 30, 40 yards, maintaining speed and relaxed form; move slowly between sprints; repeat sprints designated number of times or for prescribed time; vary by sprinting stipulated distance, return immediately to finish line, and sprint back to start, take brief rest before starting next pair of sprints; continue pattern for designated repetitions or time.
- In-and-out curves and straights--sprint curves (in) and move easily straight aways (out) emphasizing various aspects of form; for variation reverse and sprint straight aways and move easily on curves.
- Revolving relays in which the squad is divided into teams of five each. The first and fifth athletes go to the starting line with number two going to a point 110 yards from the start, number three 220 yards from the start, and number four 330 yards from the start. The Revolving Relay continues with #1 touching off #2, #2 touching off #3, #3 touching off #4, #4 touching off #5, #5 touching off #1, continuing in this way until each athlete has sprinted 110 yards four times.



Revolving Relays can be done in shuttle formation with three or five athletes on each team. Distances can be 50, 55, 100, or 110 yards with all odd numbers starting at one end and even numbers at the other. Touch off patterns are shown on the next page. Revolving Relays are excellent activities with which to end practice sessions. They bring the team together, develop group unity and cohesiveness, prepare all for relay competition, and force speed through fatigue at the end of workouts.



Repeat as many 25, 50, or 100 meter yard dashes as possible in a specified time--15, 30, 45, 60 minutes. An increase in number of dashes completed from workout to workout indicates either a shorter rest interval between repetitions or repetitions done at faster speeds--either is desirable and shows progress.

Hill or Ramp Work--Up

Hill or ramp work--up should be done daily to further strength and endurance so important to competitors at all distances. A hill or ramp twenty to thirty meters or yards long and about thirty to forty-five degrees is ideal. Athletes go up to the top of the hill or ramp as fast as possible, turn and coast down, repeating for a specified number (10, 15, 20, or more) or length of time (5 to 10 minutes). When a specified number is done, length of time in which this is accomplished should decrease. When a given length of time is used, number of repetitions should increase.

Hill or Ramp Work--Down

Hill or ramp work--down is especially effective with sprinters who should include this in their workouts a couple of times per week. Individuals in longer events can benefit from occasional down hill or ramp work. Athletes wheel as fast as possible down a hill or ramp twenty to thirty meters or yards long and about thirty to forty-five degrees. In middle or long distance events practice at faster than pace helps to develop speed. Since sprinters go at top speed, ways to move still faster must be devised; gravity assists in this when wheeling down hill as prescribed. By wheeling down hill or ramp the athlete not only goes faster but trains arm muscles in speedier responses and reactions. A specified number of repetitions or length of time is incorporated into practice sessions for down hill or ramp work.

Form Work

Form work is necessary to develop the most efficient and effective possible use of energy. Type, level, and degree of impairment, body build, hand positions on drive wheels, body positions in the chair, placement of center of gravity, and the wheelchair itself affect form on both straightaways and turns. A portion during the early part of every workout needs to be devoted to perfecting specific elements of good form. Good form must be developed through practice at less than all out speeds. As form becomes more efficient practice speeds for form purposes can be gradually increased. Only think about and concentrate on one element of form at a time. Many specific drills, exercises, and activities can be used to help in this process.

- Use laps done individually or with partners to emphasize particular elements of good form. Strive to increase speed by improving a specific element of form and without increasing effort and expenditure of energy.

- Incorporate form development into workouts such as those emphasizing speed play, distance, rhythm, and pace.

- Introduce back-to-front drills to emphasize form. Have four to six athletes in single file formation. Wheel slowly around the track; during this time emphasis and concentration can be upon perfecting specific elements of good form. The last individual sprints past the others to take the front position in the line. This procedure continues with each new last athlete sprinting past others after the one who went before has settled into the front of the line. Back-to-front drills can also be used to emphasize passing opponents, short sprints to fight off moves by opponents, and sprint form; it also is an effective way to develop and further important feelings of team unity that are often overlooked in so called individual sports such as track and field.

ANOTHER PACE APPROACH

Even pace is ideal but often difficult to attain. Although the following rules of thumb deviate slightly from exact even pace, they provide a proven framework for fast times through efficient use of energy.

- *In the 440, make the first 220 two seconds faster than even pace and the second 220 two seconds slower than even pace. For example, an 80 second quarter is split 38-42 with 110s 18-20-21-21 and 55s 8.5-9.5-10.0-10.0-10.5-10.5-10.5-10.5.*

- *In the 880, the first 440 is two seconds faster than even pace and the second 440 two seconds slower than even pace. For example, a 3:00 half mile is split 88-92 with 220s 43-45-46-46; and 110s 21.0-22.0-22.5-22.5-23.0-23.0-23.0-23.0.*

- *In the one mile, the first half mile is two seonds faster than even pace and the second half mile two seconds slower than even pace. For example, a 6:00 mile is split 2:58-3:02 with 440s of 88-90-91-91 and 220's 43.5-44.5-45.0-45.0-45.5-45.5-45.5-45.5.*

TRACK EVENTS

Individual events in wheelchair track include sprints--100 yards or meters and less--and distances--220 yards or meters through 1500 meters or one mile. With recent interest and participation in distances up to and including wheelchair marathons--26 miles 385 yards--middle distance might be more appropriate terminology for 220 yards or meters through 1500 meters or one mile. Regardless of distance there is no short cut to success in wheelchair track--the only formula for success is hard work. Challenging drills and motivating practice activities must be designed for specific purposes. In addition to basic principles discussed previously, specific attention must be given to starting procedures for all distances, training for specific events, and finishing all races. Special attention must be given to relays and for athletes taking part in the pentathlon.

Starting

Good starting mechancis are essential at all distances in wheelchair track. Sprints are often won or lost at the starting line. Good positions in middle and long distance races often come from effective starts. Poor starts not only affect athletes psychologically but make them work harder and longer to reach peak sprint speeds or attain most efficient and effective pace for middle and long distances. As in any type of training, a systematic and intelligent approach is a must to attain good starting mechanics.

- Work to have each athlete in a position with his/her center of gravity as far forward as can be handled.
- Incorporate fast starting techniques in a variety of relays and shuttle activities; use innovations such as stopping and starting on various signals to help improve reactions and starting mechanics.
- Practice starting form; emphasize each segment at different times.
- Time 15, 20, 25 yard dashes to show improvement and how starts influence times for short distances; record times on bulletin board and in personal logs to chart progress.
- Include stop and go starts in which the athlete starts, sprints a predetermined distance, stops, starts again, and continues in this pattern for a designated time or number of starts or laps.
- Include reaction starts in which the athlete develops reaction to sound of any type; concentrate on initial movements of start and reacting to starting sound; use loud sounds initially and gradually reduce to sharpen reaction to sound.
- Include all out - full speed - practice starts as part of each athlete's practice regimen.
- Use blank cartridges or extremely loud clap of Scotch gun; use a blank chamber or quiet clap to determine whether the athlete is listening for gun or actually reacting to any sound.

- Introduce all out starts only after the athlete has trained for several weeks and his/her arms are in good enough condition to withstand stress of all out starts.

- Be sure the athlete has warmed up thoroughly before practicing all out starts

- Work on all out starts early in a practice session to reduce chances of muscle pulls or suffering another injury due to fatigue.

- Restrict all out starts to one practice session a week and limit all out effort to eight or ten starts.

- Vary cadence when giving starting commands to reduce chance of the athlete guessing or starting in a set rhythm.

- Practice starts individually and then with one or more teammates.

- Incorporate staggered starts in different sections of practice sessions such as running activities, form work, starts; practice starts where different races and relays actually begin.

- Develop your own devices and activiites for practicing starting mechanics, fundamentals, and procedures; encourage athletes to develop their own approaches and activities.

Finishing

No race is over until a competitor is across the finish line. Races can be lost because an athlete who feels he/she is home free eases off before actually crossing that final line. To eliminate any chance of a premature finish, each athlete at whatever distance he/she competes should psychologically and physically go through the finish line by moving at full speed to a point five to ten yards or meters beyond the actual finish line. A good finish can not be left to chance but must be given special attention and practiced as conscientiously as any other part of a race.

- Introduce concept of fast finishes through relays and shuttle activities.

- Incorporate fast finishes and breaking tape in specially devised shuttle relays in which two athletes hold finish yarn for each team; outgoing runner may not start until incoming youngster breaks tape.

- Combine finishing practice with competing in lanes; place string or yarn at various places so get used to breaking tape.

- Practice finishes at end of different drills and various running activities.

- Provide time and opportunities for athletes to practice finishing form; do this slowly at first and gradually increase speed as skill and confidence improve.

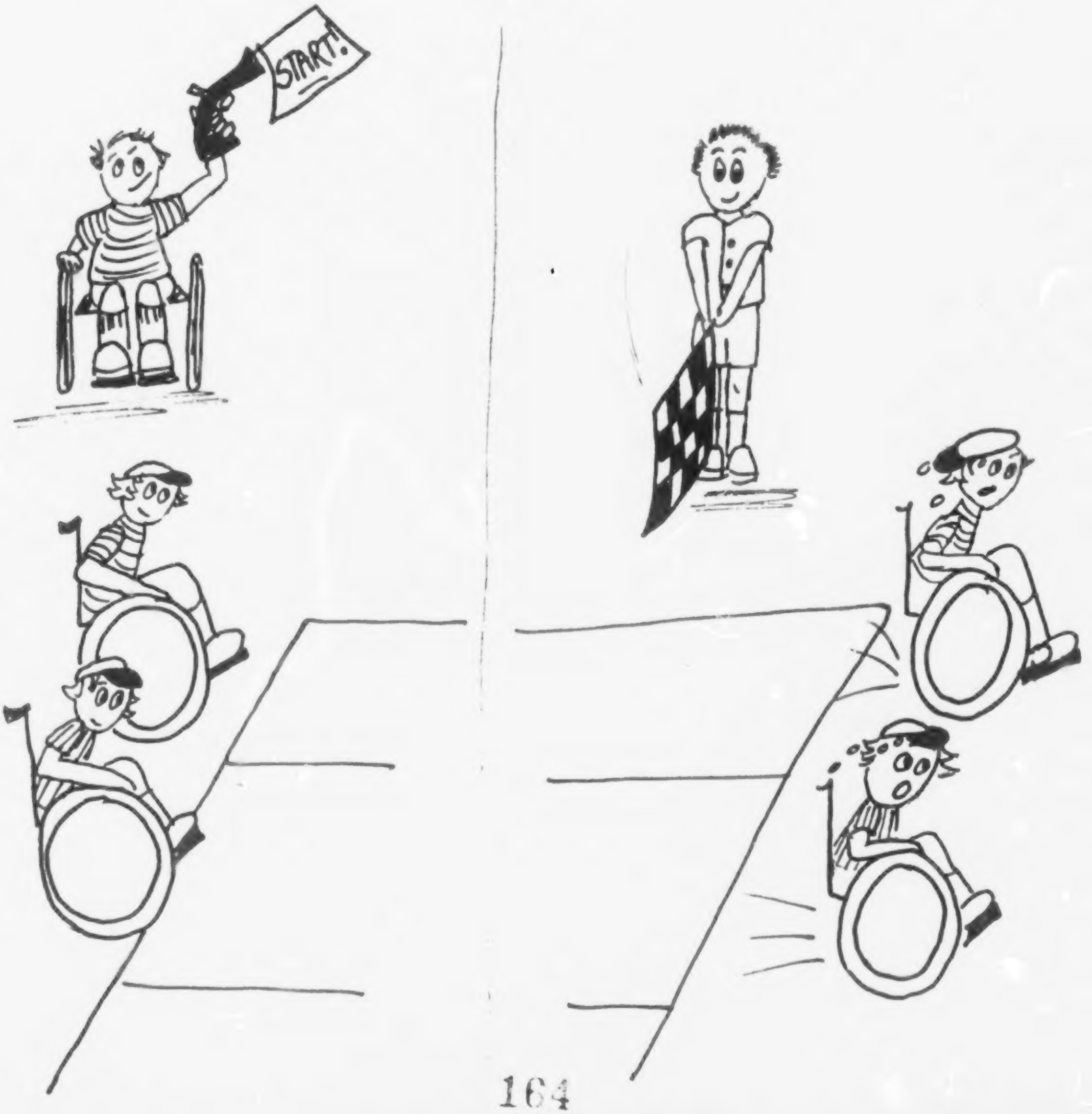
- Place colorful markers, bleach bottles, milk cartons, traffic cones, bowling pins, coat hangers with colored cloth, string, or rope some distance beyond actual finish line to help athletes develop concept and idea of moving through or past actual finish line.

- Use specific drills to develop a strong, fast, and efficient finish--

--Plus 10--have two or three athletes finish together seeing who can break the tape with all continuing ten yards further to a second mark, teammate, or coach.

--Finisher--start two sprinters 10, 15, or 20 yards from finish line and have them wheel together through finish; make this competitive--see who breaks tape first.

--Finish accelerator--synchronize arm movements while wheeling with a partner--with no conscious thought of accelerating, see who can break tape while emphasizing good finish form.



RELAYS

Basic principles for relay competition are little different for shuttle relays or circular relays going around the track. Fundamentals of basic form and for practice of specific distances are the same as for dashes. A team that learns to touch-off effectively can often gain enough yardage to win a close race even though opposing teams have faster competitors! Organizing a relay team to make best use of each competitor's talents is vital to the success of a team.

Relay Strategy

Consider each competitor's speed, condition, and ability to work with other competitors in determining order in which team members compete. For example--

- Lead-off--best starter, often second best competitor.
- Second--slowest or least experienced competitor, particularly if he/she works well with lead-off competitor.
- Third--guttiest competitor who is most likely to come from behind; often third fastest competitor.
- Anchor--fastest competitor and best finisher.

Consider other possibilities in setting up relay teams such as--

- Lead-off slowest competitor, followed by next slowest second, second fastest third, and fastest anchor; this is an accelerating team.
- Lead-off fastest competitor followed by next fastest second, second slowest third, and slowest anchor; this is a decelerating team.
- Lead-off fastest competitor and anchor second fastest particularly if he/she is a strong finisher.
- Use fastest competitor in second position so that he/she competes against slowest members of other teams.
- Compete on a person-to-person basis when abilities and weaknesses of other teams are known so that specific competitors are matched against each other.

Consider whether an individual is right or left handed when determining order for relay teams going around the track since first and third competitors touch-off with right hands and second with his/her left hand. Some individuals can adjust better to this than others so that their positions on a relay team are determined or adjusted accordingly. Obviously, an individual who has difficulty in touching-off might be considered for the anchor position.

Coaching Activities

Perfecting a smooth and speedy relay team requires time and much opportunity for members of the team to work together. Practice must be approached intelligently. Individual athletes must first develop the mechanics of efficient touch-offs. Then they must apply those so that perfect timing results when working with specific teammates at a given distance. Championship performances in relays cannot occur by simply getting four athletes together at the last minute. As in any other team activity, true champions who come through when the going is toughest develop individual skills and then hone them to the highest degree together.

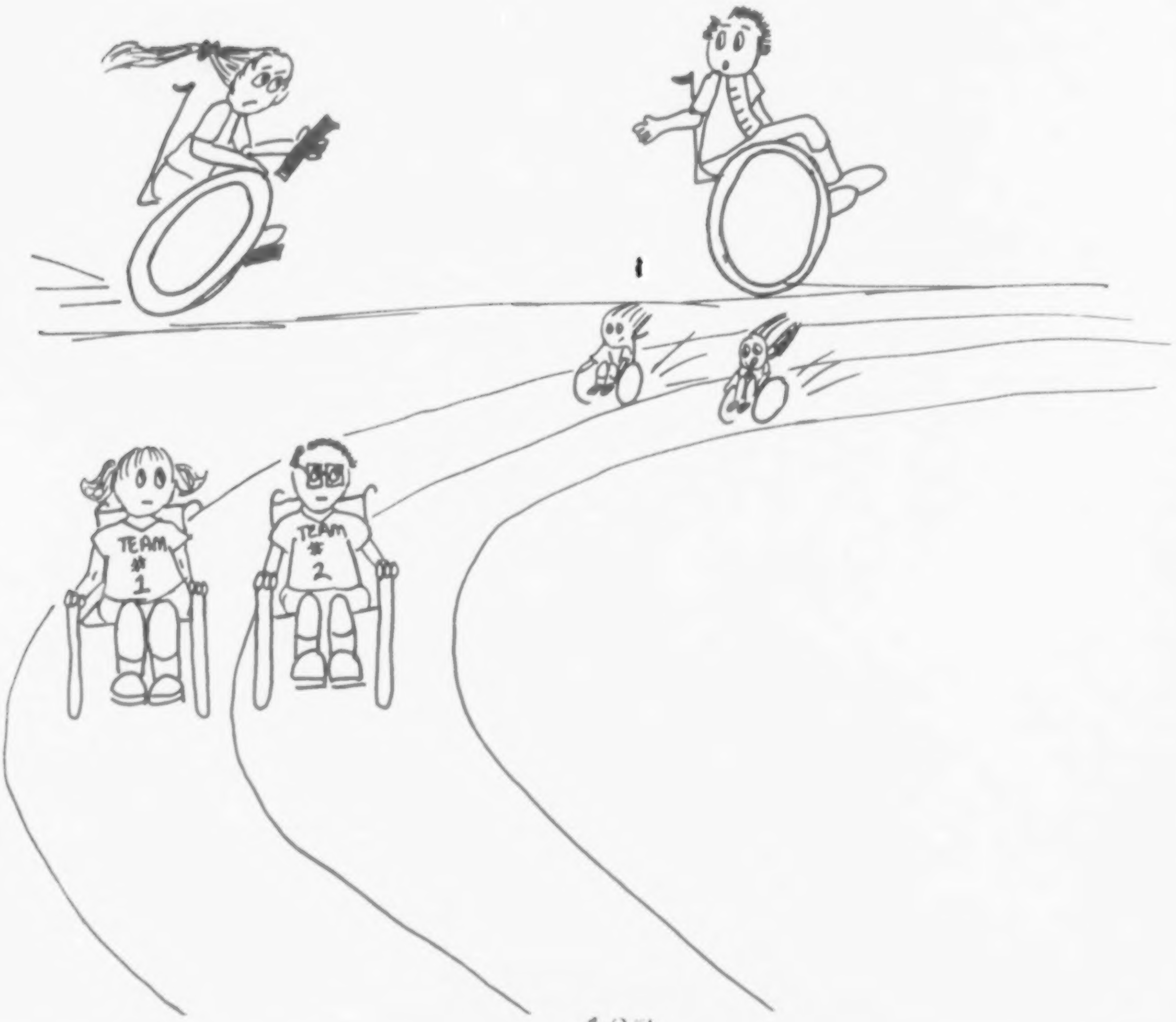
- Introduce relay concepts through a variety of line and shuttle relays.
- Divide squad into groups of five for Revolving Relays as described on page 10.
- Plan intrasquad relay meets to include regular and medley relays with legs of varying distances for either shuttle or circular patterns.
- Work on fundamentals of touch-off at slow and medium speeds gradually increasing tempo to race speed as athletes gain experience working together and achieve timing, rhythm, and continuity.
- Have some relay work in every practice session especially in fun ways at the end of workouts.
- Plan specific opportunities for competitive relay teams to work together to perfect timing and help athletes become aware of each other's moves; master mechanics and timing of touch-off; establish trigger or starting point for each outgoing athlete; adjust trigger points according to weather conditions and individual athletes.

Touch-off

Practice and working together are important ingredients to attain champsionship relay performances--there are no short cuts for developing timing, rhythm, and continuity demonstrated by top teams. Principles, fundamentals, and approaches are basically the same for shuttle and circular relays. Adaptations and applications are slightly different since competitors are moving toward each other in shuttle relays while they are moving in the same direction in relays going around the track.

- Establish a trigger or starting point to indicate when the outgoing athlete is to start; mark this point on the track with some type of tape--i.e., masking or adhesive.
- Watch incoming athlete until he/she reaches prearranged trigger or starting point on the track when outgoing athlete starts, accelerating as quickly as possible.
- Continue to look at incoming athlete until touch-off occurs and then go-go! In circular relays outgoing athlete turns head forward as soon as touch-off occurs.

- Consider nonvisual touch-offs for circular relays. As soon as the incoming athlete reaches the trigger or starting point, the outgoing athlete starts, immediately turning his/her head forward. Timing is critical in nonvisual touch-offs since a small miscalculation can result in a team fouling and being disqualified.
- Time touch-off so actual touch takes place one or two yards or meters from the starting line in shuttle relays and between seventeen and eighteen yards from the incoming restraining line in a twenty yard zone in circular relays.
- Slow down only if beyond fifteen yard mark in touch-off zone and incoming athlete cannot complete touch in the zone; incoming athlete yells, "Wait," "Stop," "Slow-down," "Help!" Outgoing athlete eases up and waits--it's better to wait than foul and be disqualified.



SELECTED RESOURCES

Competitive Athletic Programs for Impaired, Disabled and Handicapped Persons. Washington, D. C.: AAHPER/IRUC (1201 16th Street, N. W., 20036). $2.00.

Conditioning for Rehabilitation in Athletics and Wheelchair Sports - A Year Round Program. Robert R. Spackman, Jr. Murphysboro, Illinois: Schwebel Pringtin (P. O. Box 433, 62966), 1976.

NASCP - USA Constitution, Rules, Classification and National Records Sports Manual. New Haven, Connecticut: National Association of Sports for Cerebral Palsy, 1979.

National Wheelchair Athletic Association: Constitution and Rules; Training Techniques, and Records. Woodside, New York: National Wheelchair Athletic Association, Annual.

So Get On With It: A Celebration of Wheelchair Sports. Marilee Weisman and Jan Godfrey. New York, New York: Doubleday & Company (245 Park Avenue, 10017), September 1976.

Textbook of Sport for the Disabled. Sir Ludwig Guttmann. Aylesbury, Bucks, England: HM + M Publishers (Milton Road), 1976.

Wheelchair Champions: A History of Wheelchair Sports. Harriet May Savitz. New York, New York: Thomas Y. Crowell (10 East 53rd Street, 10022), 1978.

Key Periodicals

Achievement. The Achievement Disabled Action Group, 925 N. E. 122nd Street, North Miami, Florida, 33161.

Paraplegia News. Paralyzed Veterans of America, Inc., 935 Coastline Drive, Seal Beach, California, 90740.

Sports 'N Spokes. 6043 North Ninth Avenue, Phoenix, Arizona, 85013.

Organizations

National Wheelchair Athletic Association
40-24 62nd Street
Woodside, New York, 11377
Ben Lipton

National Association of Sports for Cerebral Palsy
1 State Street
New Haven, Connecticut, 06511
Craig Huber

National Wheelchair Basketball Association Project
366 Waller, #119
Lexington, Kentucky, 40504
Ed Owen

Films

Paralympics (16mm, sound, color, 13 minutes).
Chairman, United States Wheelchair Sports Fund, 40-24 62nd Street, Woodside, New York, 11377.

Paralympics - Israel 1968 (16mm, sound, color, 10 minutes).
Chairman, United States Wheelchair Sports Fund, 40-24 62nd Street, Woodside, New York, 11377.

It's Ability That Counts (16mm, sound, color, 32 minutes).
International Rehabilitation Film Library, 20 West 40th Street, New York, New York, 10018.

Olympics on Wheels (16mm or video cassette, sound, color, 18 minutes).
Woodrow Wilson Rehabilitation Center, Fisherville, Virginia, 22939.

To Live On (16mm, sound, color, 26 minutes).
Joseph Bulova School of Watchmaking, 40-24 62nd Street, Woodside, New York, 11377.

The Virtue of Energy (16mm, sound, color, 33 minutes).
International Rehabilitation Film Library, 20 West 40th Street, New York, New York, 10018.

The Fundamentals of Wheelchair Basketball for Women (½' video tape, black and white, 18 minutes).
National Wheelchair Basketball Association, Office of the Commissioner, 110 Seaton Building, University of Kentucky, Lexington, Kentucky, 40506.

PROVEN IDEAS FOR CHAMPIONSHIP PERFORMANCES

Systematic Practice Patterns

Emphasis in the early part of the season should be upon amount or quantity of work; later in the season it should be upon speed and quality of work. For example, weekly practice patterns for competitors in middle distance and distance events should generally place emphasis on . . .

Monday

... overdistance and continuous running for endurance.

Tuesday

... interval training for endurance, pace, or speed.

Wednesday

... pace work at various distances.

Thursday

... rhythm workouts for endurance or pace.

Friday or Saturday

... time trials, intrasquad meets, play days, novelty workouts, or actual competition. If competition is on Saturday, determine most effective approaches for each athlete on Friday--light workout, rest, strategy session, watch films of past meets and of competitors in the next day's meet.

The way in which an athlete paces him/herself in time trials or competition is also important to the next week's practice pattern. Any appreciable deviation from even pace for any segment of a race provides basis for practice the following week. For example, if . . .

...first half is considerably faster than second half - emphasize pace and endurance.

...first half is considerably slower than second half - emphasize pace.

...last quarter is considerably slower than each of first three quarters and/or athlete fades in final stretch--emphasize endurance and speed.

...times for quarters are extremely uneven--emphasize pace.

Additional Drills

- Form wheeling--move at quarter, half or three-quarter speed, concentrating on specific aspects of form; think about individual elements of form; experiment to find best body position, most efficient wheeling pattern, how form changes at different speeds, how to gain speed on turns, checking out.

- Pyramid--go distances of 55, 110, 220, 330, 220, 110, and 55 yards with rest intervals of 1-2-3-3-2-1 minutes or slowly move distance just completed. Pyramid workouts may or may not be timed; distances and rest intervals may vary according to individual condition and ability. Some athletes may have to start with a pyramid pattern of 55, 110, and 55 yards. As athletes get in better condition, pyramids can be repeated several times, distances increased, and/or rest intervals shortened.

- Go, durn ya, go--sprint 220 yards two to three seconds faster than race pace; wait no more than two minutes and then sprint 110 yards all out. When repeating in the same practice session, let athlete recover almost fully before next repetition. Adjust this pattern for longer distances by going first three-quarters of the race faster than pace, resting 30 seconds to two minutes, and then going last one-fourth all out.

- Superduper--go 300 yards two to three seconds slower than race pace and continue to a point 30 to 50 yards further; make conscious effort to sprint all out and maintain good form for the extra yards.

- Neutral-babe-neutral--sprint to a predetermined point--100 to 125 yards depending on individual ability and condition--at which time whistle is blown or some other signal given to indicate where to start float; continue float for 25-30 yards; a mark on or near track may also be used to indicate where to start float. In float, use momentum generated in initial sprint to keep speed up while using less pushing power--this is much like getting to a certain speed in a car on a bicycle and then maintaining speed while coasting in neutral.

Preparing for the Big Meet

The importance of practice sessions the week of the big meet cannot be overemphasized. Athletes have worked hard and long to get in condition, improve endurance, gain speed, learn pace, and prepare themselves psychologically, emotionally and physically for this important competitive effort. Just as daily practice sessions and weekly workout patterns must be developed to meet individual needs, so must final preparations during this last week. Therefore, these suggestions and guidelines are presented:

- Emphasize quality and speed rather than quantity and number of repetitions or sets.

- Be sure the athlete is well rested and has lots of energy on the day of competition; plan relaxing and fun practice activities for the day or two before competition. Some athletes do not work out at all the day before competition--this is a highly individual matter.

- Stress desired race pace throughout this week regardless of workout distances; complete each practice session with speed or sprint work to strengthen the finishing kick.

- Develop practice patterns to meet specific needs of each athlete; several individuals preparing for the same race may have quite different practice patterns.

- Stress continually the importance of pace--leading at the end of the first or second lap is not nearly as important as being first at the end of the fourth lap in the mile!

Plan Races Accordingly

The third one-fourth of races at any distance is the most difficult; the third one-fourth of each lap is often the slowest. Therefore special attention must be given to the third one-fourth of every race and each lap.

- Approach races psychologically and emotionally so that desired pace is exactly reached at the three-quarters mark, and then use competitiveness and desire as means to attain an even faster than planned last one-fourth of the race.

- Work harder mentally during the third one-fourth of each lap to avoid the tendency to slow down and lose valuable time during this critical phase of the race.

- Remember, confidence is the feeling that with preparation and application you will succeed.

ENDURANCE ----- PACE ----- SPEED

To attain championship performances in wheelchair track, athletes must develop endurance, build speed, and learn pace.

Endurance - ability to go for increasing distances and periods of time. Remember athletes must be trained to go faster for longer periods of time; in many races at all distances winners are individuals who slow down least.

Pace - ability to go specific distances in prescribed times. Remember, athletes should be trained physically, emotionally, and psychologically to attain even pace, e.g., a 6:00 min. mile consists of 4-90 sec. ¼; a 30 sec. 220 of 2-15 sec. 110's.

Speed - ability to sprint, move fast, go all out. Competitors in middle distance and distance events become sprinters during their all out finishing kicks.

PRACTICAL POINTERS

SPORT ADAPTATIONS FOR STUDENTS WITH CRUTCHES: BADMINTON, GOLF, ARCHERY, TENNIS

Jim Cowart

Today great strides are being made in the recognition of a disabled individual as a unique person who simply has an impairment, instead of a disabled individual who is limited and handicapped. Sports and recreational activities have played a significant role in overcoming preconceived ideas regarding the disabled person and his/her abilities. These activities have provided the vehicle for communicating the disabled person's capabilities to nondisabled people.

The significant role that the physical educator plays is in assisting disabled persons to develop and effectively use movement skills. To utilize these skills in meaningful sports and recreational activities is the ultimate goal. In fulfilling this role as facilitator of skill development, the physical educator is challenged by the varying abilities of students who need assisting devices, such as wheelchairs, crutches, and prosthetic devices, for independent living. Each aid presents a unique challenge to the student and his/her teacher in learning a particular skill. The teacher must determine the student's potential and develop it to the fullest.

The purpose of this POINTER is to review some accommodations that have been made to assist students with crutches to successfully participate in four selected sports. Common to all are some general points to consider when modifying programs for the crutch walker:

> Through assessment, the teacher should learn the pupil's ability to control his/her body while using crutches, and his/her level of performance in the continuum of acquired skills. With this knowledge, any needed program

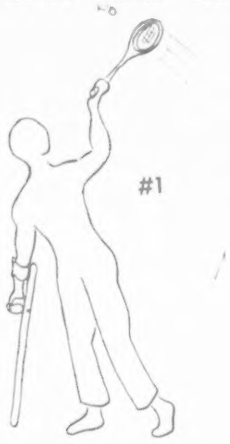
modifications can be made appropriate for the individual's capabilities.

There are many areas of game play that may be changed so that a disabled person with crutches can compete in peer-related activities. These include decreasing the playing area, permitting additional trials, bounces, or hits, reducing the number of points required to complete a game, and so on.

Finally, the modification of equipment and supplies may allow individuals with movement limitations to more fully participate with classmates in selected sports. Adjustments may consist of lowering a net or basket or using lighter, longer, or larger pieces of equipment or supplies.

BADMINTON

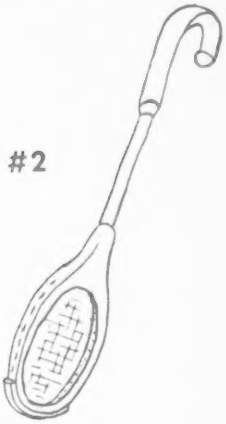
In order to see what adjustments are needed in the sport of badminton for a student dependent on crutches, it is first necessary to determine if the pupil can maintain balance with one crutch while swinging a racket with the other hand (see Figure 1). If the pupil can sustain adequate balance while swinging a racket, note whether the student can effectively move with the assistance of one crutch to rally the shuttle. Knowing the pupil's range of movement will help determine the most appropriate size of the playing space. This could involve only a slight reduction of the singles court (marked with tape) to the use of half of the regular singles playing area. A second alternative is to play doubles, in which players play side by side. Another approach to reducing court size is to play trio badminton in which the student with crutches plays side by side with another participant in the forecourt, while a third player covers the backcourt.[1] In addition, for both singles and doubles, if the individual is severely restricted in movement the "drop shot" may be declared illegal, again limiting the playing area that needs to be covered.



For a pupil who has good upper body strength and coordination, an extended racket may help increase his/her reach.[2] Such a racket may be constructed by removing the racket head from one racket and the handle from another, leaving the entire length of the shaft in both cases. The racket shafts are then connected by sliding each open end onto a 3"-4" circular rod (the rod is the diameter of the inside of the shaft) and welding the two pieces securely in place, forming a lengthened badminton racket.

Specific problems experienced by some pupils who have movement limitations are maintaining balance when using one crutch, retrieving a shuttle from the floor, and serving the shuttle. The methods described below address each area of difficulty:

** A problem experienced by some students is the inability to maintain body balance after taking a "good" swing at the shuttle. A cane handle racket (see Figure 2) was found to be of assistance.[3] In constructing the cane handle racket, a regular racket handle is first removed and replaced with a cane handle. Then a rubberized material is attached to the racket top, providing the student with a crutch that can be used to help maintain a greater degree of balance.



#2

** Some students have difficulty retrieving the badminton bird from the floor. An aid that has proven helpful was developed by Fait.[4] Strips of Velcro are attached around the base of the shuttle, as well as to the top of the racket. The addition of the velcro to the bird does not seem to adversely affect the flight, while it provides a practical means for recovering the shuttle.

** Serving proves a difficult task for some individuals because of the need to use one hand to hold a crutch for controlling the stationary body position. One method that may be helpful is to place the bird on the strings of the racket being held in the free hand. Next lift the racket upward propelling the shuttle into the air, then strike the bird with an underhand stroke. A second method is to hold the bird with the thumb and forefinger of the crutch hand. When ready to serve, the player releases the bird and the racket is brought forward to hit the shuttle with an underhand stroke.

If a student needs two crutches to maintain body stability, an alternative approach is to have the individual sit while participating. A stable chair on wheels with arm rests (often found in school offices) or a wheelchair provides the pupil body stability while swinging the racket, and offers a convenient means of retrieving a shuttle out of play. Being in a wheelchair may be new to some pupils. In such cases practice may be necessary before the individual feels comfortable and plays effectively. The student in a seated position will probably experience some of the same problems as one using crutches, i.e., limited mobility, difficulty in retrieving a shuttle from the floor, etc. In most of the cases, the solutions discussed above for a pupil needing crutches apply also to the person in a seated position.

GOLF

Golf is another sport in which a student with crutches can participate with success. As with badminton, the student may find that support can be maintained with one crutch while swinging a club with the free hand (see Figure 3). In such a case a right-handed individual is encouraged to use a right-handed club and play forehand while supporting himself/herself with a crutch in the left hand (vice versa for a left-handed person). This approach is emphasized because the pupil is generally capable of greater initial control of the club with the forehand swing. (If a right-handed individual chooses to use a left-handed club and play backhanded, then he/she should be assisted in developing this technique.)

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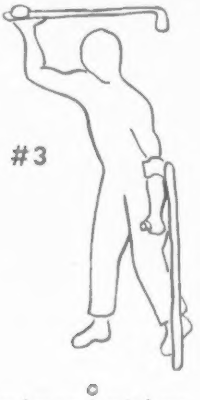

Balance and club control are the key areas that need to be perfected. Through experimentation the individual will find the best position to place his/her crutch in order to sustain a stable base of support while swinging the club with the free hand. The hand and arm will be emphasized in the swing. The amount of shoulder and trunk involvement in the swing will depend on the student's ability to maintain body balance.

If students are unable to support themselves without using both crutches, then they may find success by half-leaning, half-sitting against a raised bench[5] (see Figure 4). While in this position, they should try to support themselves in as straight a position as possible. Having legs slightly spread assists in providing a stable base of support. As with a one arm swing, the hands, arms, and shoulders are emphasized in the swing more than the body turn. For individuals unable to maintain balance while leaning against a bench the next reasonable accommodation would be a wheelchair where they would be even more securely planted. General points helpful in adjusting to the seated position are: securely lock the wheels of the chair to prevent movement during the swing; add a large cushion to the seat of the chair to increase height; use a safety strap around the abdomen or chest region to

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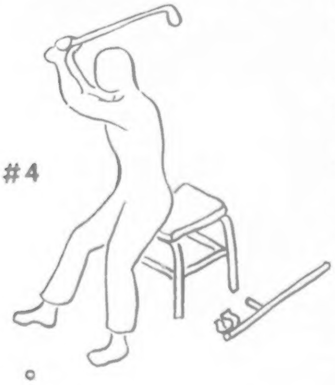
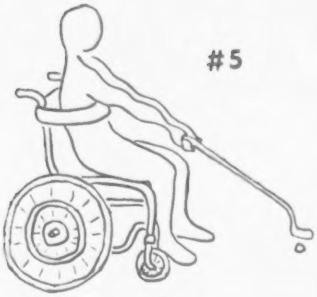




#5

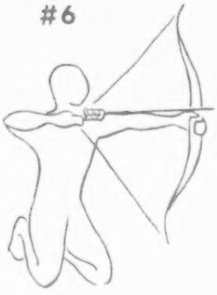
help maintain balance; remove the foot and/or arm rests to permit a freer swing.

A specific adaptation that has proven useful and practical to some wheelchair students is the use of a golf club with an angled shaft[6] (see Figure 5). When seated in a wheelchair an individual is often lower to the ground than if he/she were standing, and therefore the sole of an ordinary golf club held by the student while seated will be tilted up at an angle instead of being flat. This, of course, prevents consistency in hitting the ball. The use of the modified club with a bent shaft permits the sole of the club to be flat on the ground, thus affording the chance for more consistency. To construct a modified club the shaft of a golf club is cut into two pieces just above the ferrule. A metal rod 6"-8" long and the thickness of the inner diameter of the cut shaft is bent several degrees at its middle. The head end of the club shaft is placed onto one end of the bent rod and the handle portion of the shaft is inserted over the other rod end. The club is then welded at the points to make a solid unit.

ARCHERY

In archery, as with the other sports that have been reviewed, the major adaptation needed by a student with crutches is securing a balanced position when shooting. The approaches used by students include kneeling on the ground or a low bench, inclining against a high stable bench, or sitting in a regular chair or wheelchair.

#6



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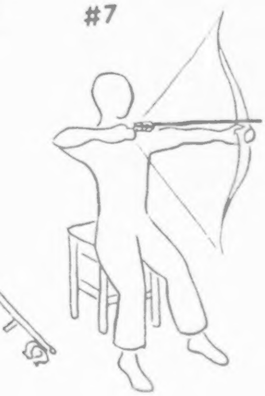

Some students find that kneeling offers the best base of support while shooting (see Figure 6). Kneeling on grass is adequate, but a firm pad or low bench on which to rest the knees works better when the grass is wet, as is often the case in the early morning hours.

Some pupils wearing long leg braces prefer to lean against a raised bench (similar to that mentioned in the golf section) when assuming a shooting position (see Figure 7). By trial and discussion, the best position on the bench for stability, comfort, and alignment with the target can be determined.

In both of these two positions (kneeling on the ground and leaning against a raised bench) the fundamental steps normally taught to nonhandicapped archers (nocking, bow hold, draw, anchor point, aim, release, and follow-through) are identically taught to these students and without any modification unless in response to a specific need.

For some youth, sitting in a regular chair or wheelchair is the only stable shooting position. Seated students, as with those who are kneeling on the ground or leaning against a bench, will pretty much follow the same basic steps in the shooting process that are stressed with able-bodied peers. There are a few exceptions. For example, instead of being concerned with foot placement, students in chairs are interested in position of chair in relation to target; chair position is important for stability as well as for providing greatest degree of shooting accuracy. In addition, it is important to find proper body position within the chair so a comfortable position can be assumed consistently when shooting. Lastly, for an individual in a wheelchair the bow arm in the "extended shoulder" form is recommended because it creates a longer draw; such a draw seems to help keep the bowstring away from the wheel of the chair or arm rest when shooting at short distances.[7]

If, after making suggested adjustments related to body and/or chair position and introducing students to basic shooting technique, it is found, as with some nonhandicapped youth, a pupil still experiences difficulty, consult the J. Cowart article on archery.[8]

TENNIS

Problems for students on crutches playing tennis are similar to those in badminton: maintaining body balance, stroke execution,[9] serving the ball, and retrieving a ball from the ground.

As with badminton, it is necessary to note whether or not the student is capable of supporting himself/herself in an upright position using one crutch while swinging a racket with the free hand (see Figure 8). If stability is maintained, the question becomes how mobile can the pupil be on the court? Assessment through trial and discussion between student and teacher will be necessary. The pupil's range of movement, as in badminton, should govern size of playing space. Half a singles court may initially be used. In addition, the player may be allowed

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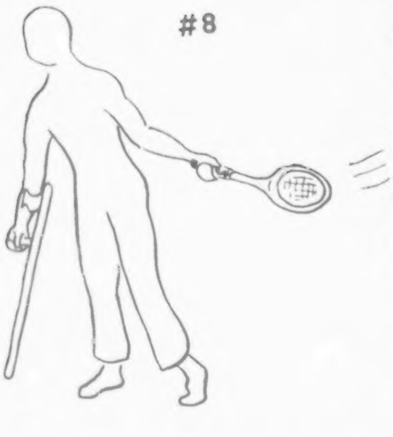


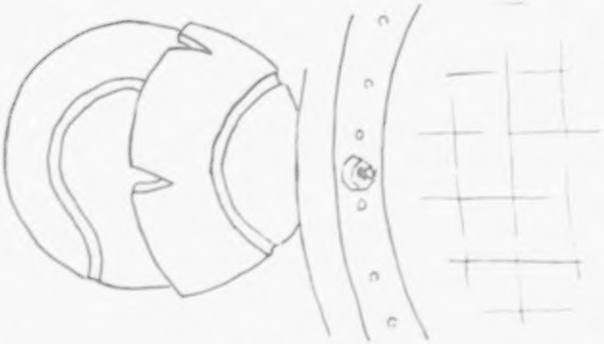
two or three bounces to return the ball. If further restriction is needed a portion of the forecourt closest to the net can be declared out of play. Another approach is to play doubles or triples on a normal singles court, with a two or three bounce rule if needed. Such accommodations have proven effective in involving a crutch walker in the game of tennis.

When possible, the disabled student should be taught the basic grip and standard techniques for executing the basic strokes. Where this is difficult, modifications need to be made. For example, for beginners it is sometimes hard to get into position to execute the regular forehand and backhand strokes. When this happens, the most practical approach is for the pupil to adjust the swing so ball contact is made with racket face directing the ball back over the net. This technique may not incorporate the basic points found in the typical tennis stroke--sideward stance, backswing of racket, weight shift of body, follow-through. With time the pupil will become more adept at moving around the court and positioning in relation to flight of the ball. Then more conventional stroke patterns can be developed.

In serving, a student who can sustain a stable position may be able to hold the ball with the thumb and forefinger of the crutch hand and toss it into the air. Then the racket is brought forward in the regular manner to hit an overhand serve. Some individuals may be unable to serve overhand because of the need to keep the crutch in contact with the ground at all times. In this event two options are possible, both making use of an underhand serve. The first technique involves positioning the body such that the forward shoulder of the crutch arm is forward. The ball is held with the thumb and forefinger of the crutch hand. When the player is ready to serve, the ball is dropped, and after one bounce is hit with an underhand stroke. The second method is to place the ball on the strings of the racket while holding the racket in the free hand. Lift the racket slightly upward propelling the ball in the air; following a bounce the ball is struck using an underhand swing.

Some pupils using one crutch to play tennis have found it difficult to retrieve a tennis ball from the ground. For these students a tennis ball retriever can be easily made for this purpose.[10] The retriever is made from a tennis ball cut approximately in half (see Figure 9, next page) and secured to the edge of the racket head or to the end of the handle. To retrieve the ball, simply press the adaption on the ball. The firmness of the rubber holds the ball and allows it to be easily retrieved.

The use of a wheelchair may be necessary for a student who has been unable to effectively play in an upright position. On the



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whole, for a seated student, as with a pupil using crutches, the basic grip and strokes are taught with modifications centering on the position of the wheelchair in relation to the ball, method for maintaining body stability in the chair, and so on. In addition, because of the limitation in movement it will probably be necessary to include game modifications similar to those introduced for a student needing crutches, i.e., to reduce the size of the court and to allow additional bounces before play is stopped.

Lastly, a major problem for a person unfamiliar with a wheelchair is to learn to effectively move the chair, with racket in hand, about the court. It is a complex task that involves pushing the chair, adjusting the movement so that the chair is in the proper position in sufficient time to allow for preparation of the arms for the stroke, and then effectively contacting the ball with the racket. For a detailed description of methods of maneuvering a wheelchair and executing a stroke while seated, refer to the series of articles by Brad Parks in Sports 'N Spokes.[10]

CONCLUSION

It is hoped that the general points reviewed at the beginning of this article and the examples of program adaptations presented to help pupils with crutches successfully participate in four popular sports will be helpful. These suggestions should provide a starting point from which to offer an effective program for any crutch walker who desires to experence the joy of participating in these sports.

ENDNOTES

1. Chrisman, D. "Badminton at 65 and Older." JOHPER 50.

2. Cowart, J. "Badminton for the Disabled." GWS National Coaches Council Newsletter 2, Fall 1977.

3. Cowart, J. "Cane Handle Badminton Racket." AAHPER/IRUC Briefings 2, May 1977.

4. Fait, H., and Shivers, J. Therapeutic and Adapted Recreational

Services. Philadelphia, PA: Lea & Febiger, 1975.

5. The original idea was obtained through correspondence with Peter Longo, golf pro, P.O. Box 27283, Tempe, AZ 85282.

6. Cowart, J. "Adapted Golf Club for Seated Student." AAHPER/IRUC Briefings 4, January 1979.

7. Whitman, J. "Coaching Techniques for Wheelchair Archery." National Wheelchair Athletic Association, 40-42 62nd St., Woodside, NY 11377.

8. Cowart, J. "Archery Pointers for Disabled." AAHPER/IRUC Briefings 3, October 1977.

9. A game stressing the use of an "all ball" (tennis ball size nerf ball) on a badminton court with a lowered net has been helpful to students in their stroke development.

10. Cowart, J. "Tennis Ball Retriever." AAHPER/IRUC Briefings 5, January 1980.

11. Parks, B. "Wheelchair Tennis--Parts 1, 2, 3, and 4." Sports 'N Spokes 6, Sept.-Oct., 1980; Nov.-Dec., 1980; Jan.-Feb., 1981; Mar.-Apr., 1981.

PRACTICAL POINTERS

SPORTS ADAPTATIONS FOR UNILATERIAL AND BILATERAL UPPER-LIMB AMPUTEES

Jim Cowart

Periodically a physical education teacher has in class a student who is missing either partially or totally one or both upper limbs. There is a good chance the student has been, or is being, fitted with a prosthesis, or two prostheses in the case of a bilateral arm amputee, to provide substitutes for lost functions. For the most part unilateral arm amputees can participate in almost all activities offered in general physical education programs. In some sports, such as softball, a prosthesis will be of assistance to the participant; in other activities, e.g., contact sports, prosthetic devices may have to be removed to avoid risks of injuries to all concerned. The few activities requiring modification for unilateral upper-limb amputees as well as most sports for bilateral arm amputees cause concern for many physical education teachers. Instructors feel unsure, for example, in archery, whether or not they can adequately meet special needs of these students. Feelings of inadequacy are primarily due to lack of experience in working with students who are missing one or both upper limbs.

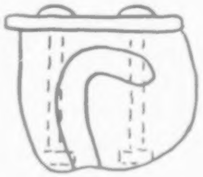
This PRACTICAL POINTER offers examples of adaptations that have been developed for use by unilateral and bilateral upper-limb amputees in a few selected sports--archery, badminton, baseball, softball, bowling, golf, and table tennis. All modifications reviewed emphasize use of the individual's prosthesis, thus offering a student additional opportunities to improve ability to control his/her terminal device. Specific details regarding construction of teacher-made adaptations are not included, but reference is made to sources of such information. Names and addresses of companies manufacturing commercial items are noted.

Appreciation is extended to Jane Silverman Bradtke, AAHPER/IRUC information and materials assistant, for the pictorial collages.

ARCHERY

Unilateral Upper-Limb Amputations

A number of approaches have been taken to assist unilateral arm amputees participate in archery. Selection of adaptions has often been by student choice and functional abilities as well as availability of materials. Review of a few archery adaptions follows.



Archery Release Aid

Illustration #1

Archery Release Aid (3:5). One student preferred to hold an archery bow with his normal hand since he felt that he had greater bow control. A release aid was made to fit his prosthetic hook which allowed him to pull and release the bowstring. This method worked well because this student had effective control of his remaining stump and attached prosthesis.

Stationary Bow Holder (5:79). Another approach to providing a one-armed pupil opportunities to participate in archery was through constructing a stationary bow holder. Two pieces of copper tubing were clamped to an archery bow, one piece of tubing above and the other below the bow handle. The other end of each piece of pipe was inserted into separate holes in a vertical wood standard. To stablilize the bow holder for outdoor use the standard was inserted into a concrete mold that had been sunk into the ground. For indoor use the holder was inserted into the base of a volleyball standard and fastened to the gymnasium floor. This arrangement supports the bow in an upright position. The single-handed person is then able to pull and release the bowstring with his/her normal hand without using the other arm.

Bow Held with Artificial Hand. A rather interesting adaptation makes use of an artificial hand. An archery bow grip/handle is adjusted to fit a Robin Aid Hard Hand. (1) When the individual wants to get involved in archery, he/she removes his/her conventional hook and replaces it with the artificial hand. By activating the fingers of the terminal device, the archer is able to grip the bow firmly. This modification allows an amputee to pull the bowstring with the normal hand.

Accru-Hook System (2). A new commercially-made terminal device available for purchase--the Accru-Hook System--may make it easier for amputees to be more successfully involved in a variety of sports, including archery. The hook looks much like a conventional hook except it has an opening in the stationary finger of the hook. In the case of archery, an adaptor post can be fastened to the side of the archery bow. The post is then slipped into the opening in the stationary finger and automatically locked firmly into place. This allows the bow to become an extension of the prosthesis to provide bow control and stability. The normal hand can then be used to pull and release the bowstring. The locking level can easily be released to permit quick removal of the bow.

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[1] Information obtained through personal conversation with Mr. Robinson, Robin Aids Prosthetics, 3353 Broadway, Vallejo, California, 94590.

[2] For additional information related to the Accru-Hook System, write Pope Brace, 197 South West Avenue, Kankakee, Illinois, 60901.

Bilateral Upper-Limb Amputations

An adapted bow recently made for a bilateral arm amputee seems to be a promising modification. The limb with the prosthesis which holds the archery bow had missing only the hand, wrist, and a portion of the forearm. As a result, this student could hold the bow steady and securely. The release aid (see Illustration #1, page 3) was held in the other prosthetic hook and used to pull the bowstring. With use we will better know if the adapted bow proves to be as useful and effective as it presently seems to indicate.

The commercially made Accru-Hook System (see page 3) seems to offer a very effective method of attaching an archery bow to one of the prosthetic devices of a bilateral upper-limb amputee. A release aid can then be held and used in the pupil's other hook.

Adapted Archery Bow

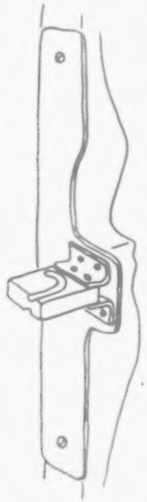
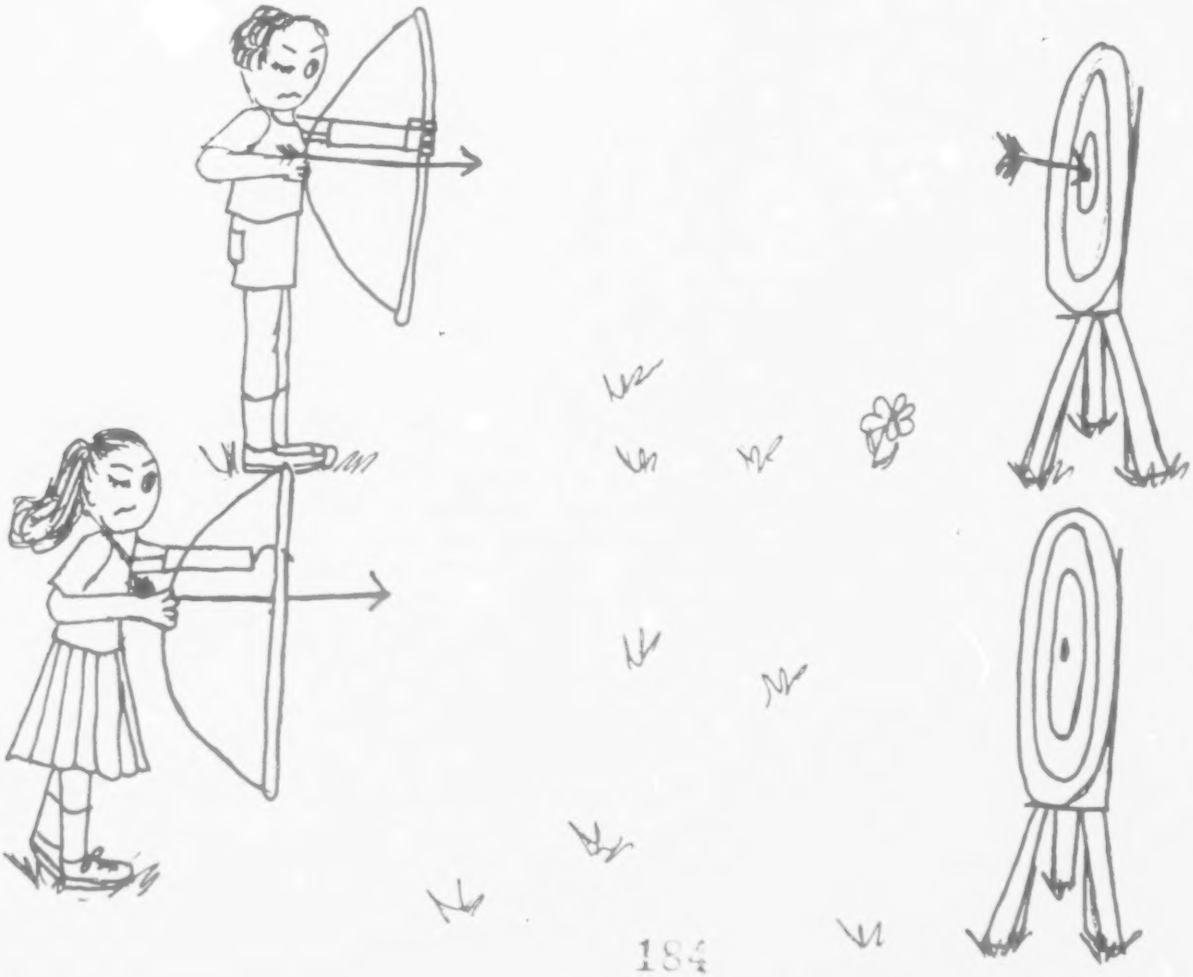


Illustration #2



BADMINTON

Unilateral Upper-Limb Amputations

The unilateral arm amputee can play badminton with his/her normal hand. Except for serving, few adjustments are necessary. Two satisfactory modifications related to serving are discussed below.

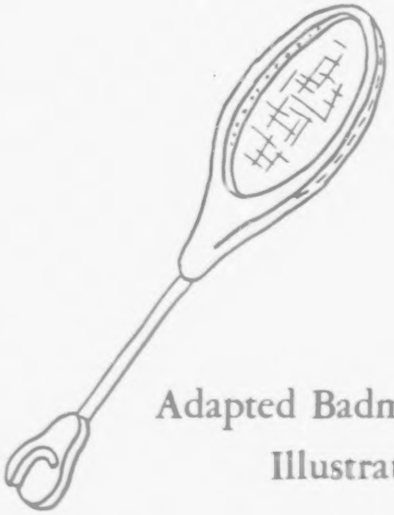
Use of Hook. One approach is for the student to pick up the shuttle with his/her hook. When ready to serve, the individual places the shuttle on the strings of the racket which is held in the normal hand. Next the player lifts the racket upward projecting the bird into the air and then strikes it using the same underhand stroke that able-bodied students use.

Serving Tray (1:159). Another technique makes use of a serving tray. The tray consists of a base to hold the shuttle, a handle that is gripped by the individual, and a cuff to secure the device firmly to the student's prosthesis. To serve the shuttle, the student places it on the tray, lifts and rotates the prosthesis which releases the bird. The racket is then brought forward with the normal hand to hit the shuttle with an underhand stroke.

Bilateral Upper-Limb Amputations

An adapted racket made badminton a realtiy for a student with congenital amputations of both upper limbs. A badminton handle was constructed so that it could be gripped with one of the student's hooks. As a consequence of the adapted racket, this individual developed ability to rally with an underhand stroke on a reduced playing area (3:12).

Coming up with an effective serving technique for a bilateral arm amputee was a real challenge for both teacher and student. The approach that was proven somewhat effective was the first serving technique discussed earlier for unilateral arm amputees (see above). The student retrives the shuttle with the free hook, places the bird on the racket face, quickly lifts the prosthesis and projects the bird into the air, and then hits it using an underhand stroke. This approach requires a good deal of muscle control and timing.



Adapted Badminton Racket
Illustration #3

BASEBALL/SOFTBALL

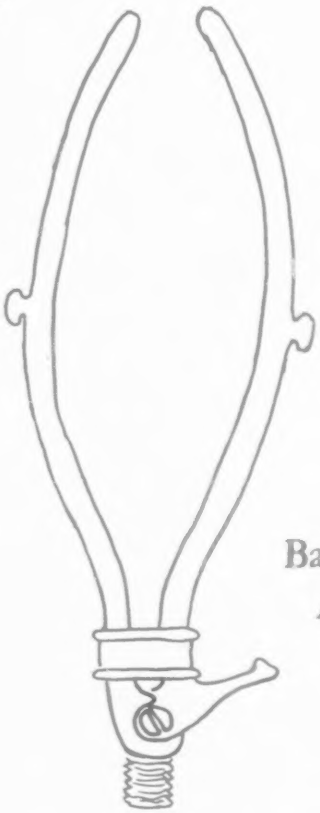
Unilateral Upper-Limb Amputations

Baseball and softball are two of the more popular sports that one-arm young people seem to enjoy playing. Adaptations that may be necessary for a single-handed individual center around catching, throwing, and batting. Successful modifications of these skills that have been made for and used by some students follow.

Catching. Some short below-elbow amputees have been fitted with a special baseball/softball glove attachment for their prostheses. One device made by Hosmer/Dorrance (3) is shown in Illustration #4. This adaptation is designed to offer a gripping action in the thumb and forefinger of a glove. Small knobs on the extended fingers assist in holding the glove to the fingers.

Robin Aids Prosthetics (4) also makes a baseball/softball glove attachment that differs from the Hosmer/Dorrance terminal device in both design and principle. The Robin Aids' attachment includes four fingers. These fingers are first inserted into the gloves' fingers and thumb holes. Once the glove is in position on the terminal device, an effective glove pocket can be shaped by the normal hand so that the individual is ready to catch a ball.

Other one-arm amputees prefer to use the baseball/softball glove on their normal hands. This works well for catching but may present problems in securing the ball to throw. Most of these individuals after catching the ball simply toss it six to eight inches into the air, take the glove off and place it under the stump or opposite arm pit, grab the ball, and make the throw. This procedure is used when catching fly balls or in fielding bunts or ground balls.



Baseball Glove Attachment

Illustration #4

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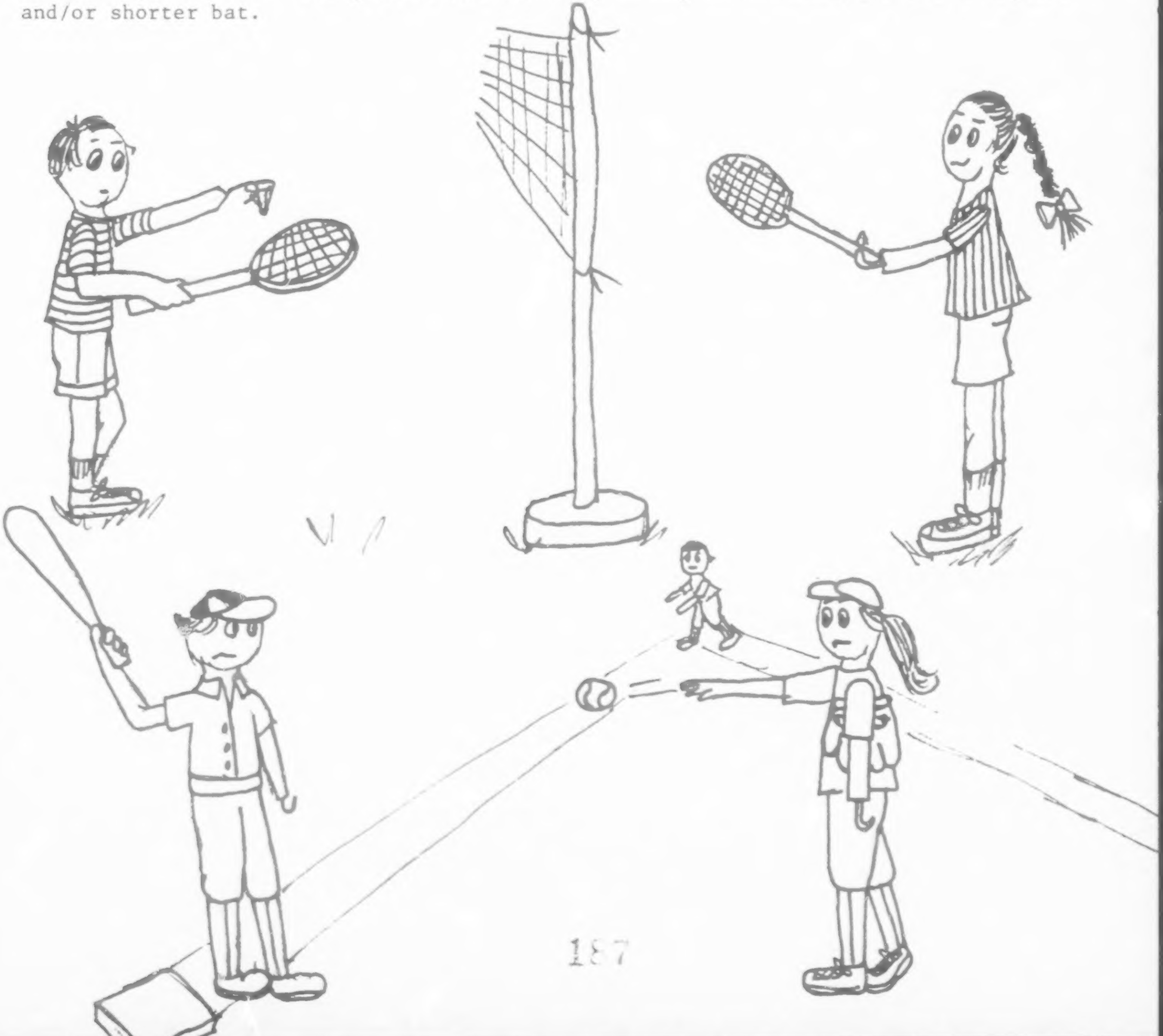
[3] Hosmer/Dorrance Corporation, 561 Division Street, P. O. Box 37, Campbell, California, 95008. Your local dealer in medical supplies will probably have a Hosmer/Dorrance equipment catalogue.

[4] Information from Mr. D. Schroeder, Robin Aids Prosthetics, 3353 Broadway, Vallejo, California, 94590.

Throwing. Throwing by a unilateral upper-limb amputee who wears a baseball/softball glove over a terminal device is much like that of an able-bodied individual. Once the ball is caught in the glove, simply remove the ball with the normal hand and make the throw.

Two practical techniques single-handed players use to remove a ball from a glove on their normal hands so as to make throws with the same hand follow. One method consists of tossing the ball into the air with the glove hand, shaking the glove off the hand, immediately catching the ball while it was still in the air, and then making the throw. A second method is to place the glove with the ball in its pocket under the opposite arm and then slip the hand out of the glove so the ball remains in the glove. Then the ball is removed from the glove and the throw made.

Batting. A one-armed student can bat using the remaining arm. If the normal arm is the right, the batter positions him/herself at the plate much like an able-bodied right hander. For greater bat control, it may be necessary to use a lighter and/or shorter bat.



BOWLING

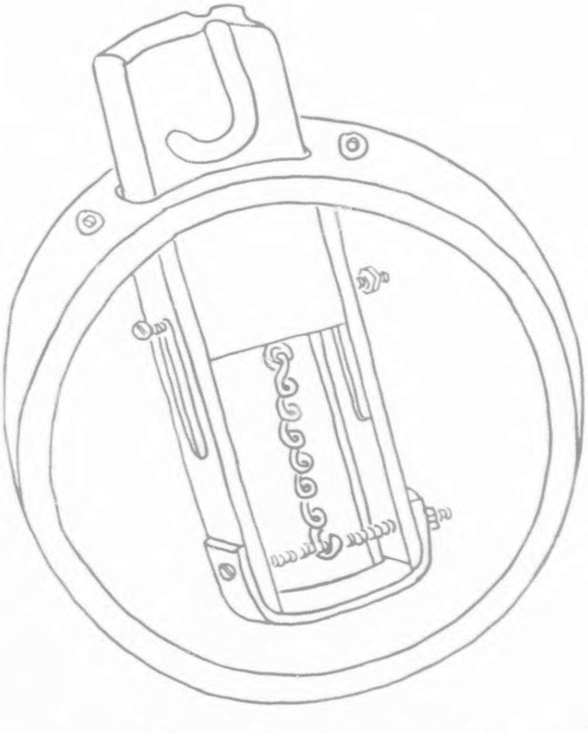
Unilateral Upper-Limb Amputations

Bowling is an activity in which a single-handed individual can achieve considerable success. The only recommendation generally made is that the student wear his/her prosthesis to help develop body balance and coordination in executing bowling skills.

Bilateral Upper-Limb Amputations

Four bowling adaptions for bilateral arm amputees will be discussed. The first is a modification of the rubber Safe-T-Play bowling ball used by teachers in school gymnasiums, in cafeterias, on playgrounds, and in classrooms. The second device was developed to hold a duckpin bowling ball. The last two bowling adaptations were made for use with regulation bowling balls; one is teacher-made and the other manufactured commercially.

Adapted Safe-T-Play Bowling Ball (2:6). Safe-T-Play bowling is a popular activity in many secondary schools. An adapted Safe-T-Play bowling ball was created for a student with a congenital bilateral upper-limb amputation. The ball has two unique characteristics. The first is a handle which the student can easily hold, freely swing, and consistently release. The second feature is that its handle retracts into the ball when released thus allowing for a somewhat noisy but straight roll. The purpose for its construction was to provide a specific individual with opportunities to participate in activities enjoyed by peers.



Adapted Safe—T—Play Bowling Ball

Illustration #5

Duckpin Bowling Device (4:13). A hospital staff, recognizing rehabilitative values of coordinating recreational activities with treatment procedures, created an effective device so that a bilateral arm amputee could enjoy duckpin bowling. Two key items used in constructing the appliance included a suction cup and a tire valve-stem assembly. The device was supported on the stationary finger of the hook in such a manner that when the moveable finger was opened it hit a release lever that depresses the valve-stem. To operate the terminal device the individual pressed the suction cup firmly against the ball to create a sufficient vacuum to support the ball. In turn, the ball was released by simply opening the hook which broke the vacuum in the suction cup thus freeing the ball to roll.

Bowling Scoop (6:79). A bowling scoop was constructed to assist a bilateral arm amputee deliver a regular bowling ball. The scoop was secured to one of the student's prosthetic devices with velcro straps in combination with an eyelet into which the top of the hook was inserted. After securing this device to the prosthesis the bowling ball was slid into the placement section of the scoop and tilted back. The arm without the scoop was placed under the scoop for additional support. To release the ball, the individual bend at the knees and waist and tilted the scoop down toward the floor so that the ball rolled forward.

Bowling Attachment. Hosmer/Dorrance (5) makes a terminal appliance that can be used to hold and release a regular bowling ball. The main feature of this aid is a sleeve that is normally under constant tension which results in an expanded position. The sleeve can be made thinner by the same action used to activate a conventional hook. To place the sleeve into the finger hole of a bowling ball, the individual simply activates the control cable which stretches the sleeve; the sleeve is then inserted into the hole. On releasing tension on the cable controls, the sleeve expands resulting in a firm grip on the ball. To release the ball, the individual again causes the sleeve to stretch.

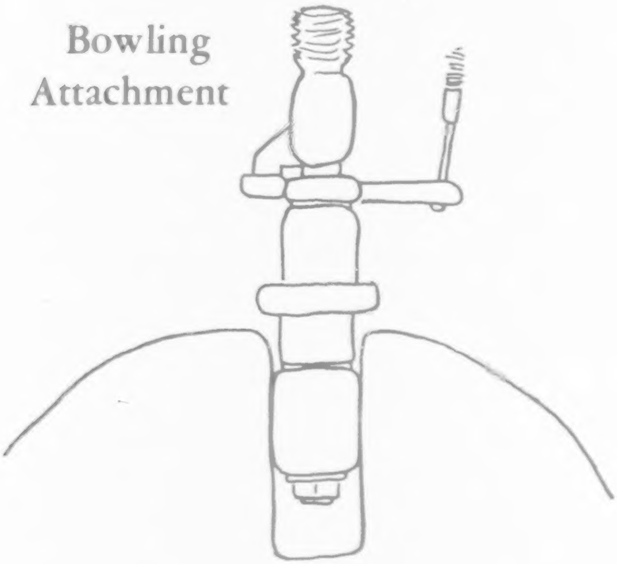


Illustration #6

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[5] Hosmer/Dorrance Corporation, 561 Division Street, P. O. Box 37, Campbell, California, 95008.

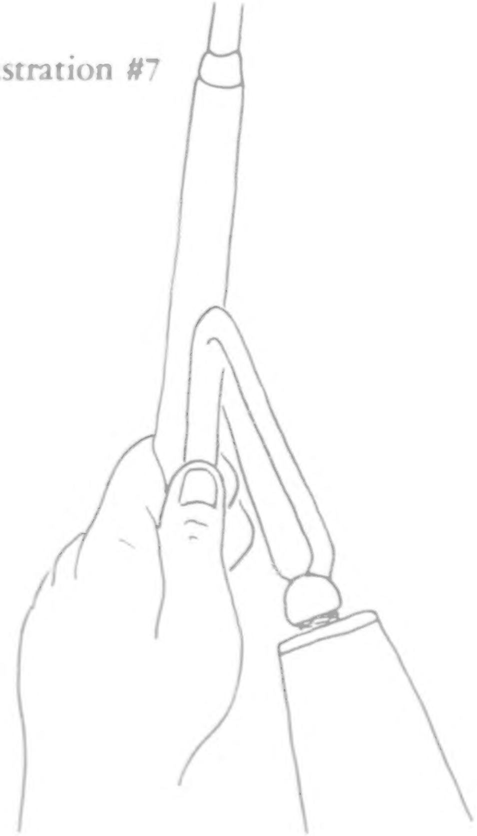
GOLF

Unilateral Upper-Limb Amputations

Golf is another sport in which a one-armed person can successfully participate. Right-handed individuals--or left-handed--differ as to whether left or right-handed clubs should be used. Some right-handers use a right-handed club and play forehanded while other choose a left-handed club and play backhanded--vice versa for left-armed persons. Personal preference seems to be the deciding factor in club selection.

Robin Aids Prosthetics (6) has developed a terminal device that may be used by below-elbow amputees to add additional club control and stability.

Illustration #7



Golf Aid

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[6] Information from Mr. D. Schroeder, Robin Aids Prosthetics, 3353 Broadway, Vallejo, California, 94590.

TABLE TENNIS

Unilateral Upper-Limb Amputations

Table tennis is an activity in which one-armed amputees can achieve high levels of proficiency and readily compete with able-bodied peers. As with badminton, the only modification that probably needs to be made is in serving techniques. One approach used by a single-handed student was to hold the paddle with little finger, ring finger, and forefinger. The thumb and middle finger were used to grasp the ball. To serve, the individual simply tossed the ball into the air with an upward motion of the forearm while releasing the ball. The individual was then able to execute a legal serve.

Bilateral Upper-Limb Amputations

A bilateral upper-limb amputee desired to participate in table tennis. Wishing to encourage this student in developing skills in this recreational activity, a table tennis paddle was made as shown in Illustration #8. He was able to rally the ball successfully using the adapted paddle (3:14). However, the one area where an effective technique has not been developed is serving. Presently, if the ball is out of play on the amputee's side of the table or floor, he simply hits or kicks the ball to his opponent who does all the serving. In spite of an inability to serve, this individual over the last two years has become extremely proficient in playing table tennis.

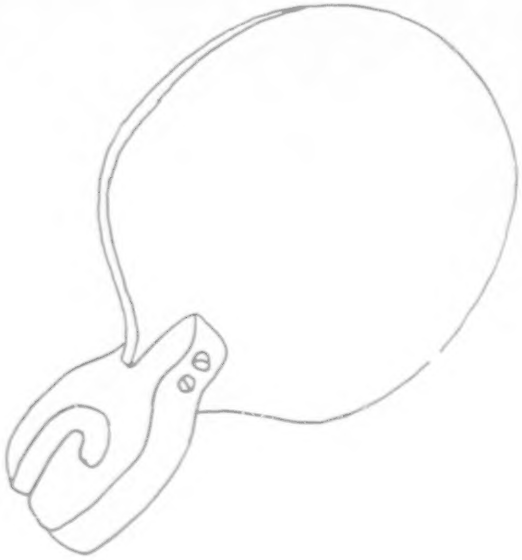
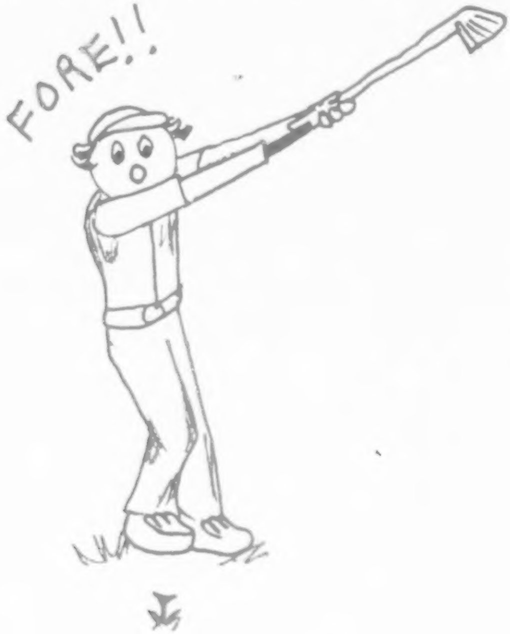


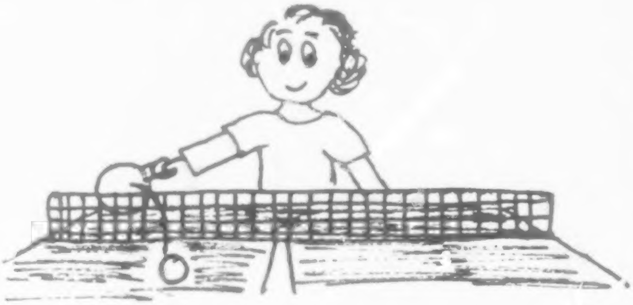
Illustration #8 Adapted Table Tennis Bat

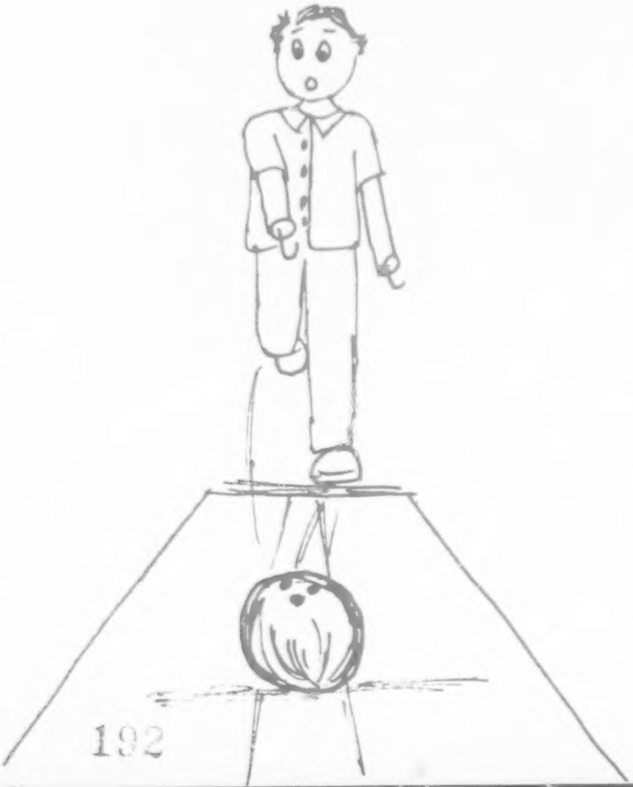
SUMMARY

An attempt has been made to broaden the readers' backgrounds of adaptations that have been created by others to assist unilateral and bilateral upper-limb amputees have successful and satisfying experiences in a variety of physical education, recreation, and sport activities. With such information, it is hoped instructors will have a base of knowledge to expand activity horizons of upper-limb amputees who may presently be in their classes.

NOTE: Readers are encouraged to send information about adapative devices and other modifications that enable students with different handicapping conditions to participate actively in various physical education, recreation, and sport activiites. Send your innovative approaches and creative ideas to AAHPER/IRUC, 1201 Sixteenth Street, N. W., Washington, D. C., 20036.







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PRACTICAL POINTERS

TEACHER-MADE ADAPTED DEVICES FOR ARCHERY, BADMINTON, AND TABLE TENNIS

Jim Cowart

Students in physical education classes -- regular as well as adapted -- differ greatly in activity capabilities and limitations. To plan a program that is effective in assisting each student develop to his/her maximum capabilities is a worthy challenge for every physical education teacher. Through careful curriculum planning a teacher should be able to offer activities, generally with minimum modifications, appropriate to each student's needs. Such modifications may include adjusting rules, changing playing spaces, increasing the number of participants, and/or reducing playing time.

For some more functionally limited students, however, such activity adjustments are not sufficient. A reasonable standard to determine appropriateness of an activity is whether or not a student can safely, successfully, and with personal satisfaction participate in that activity. If this standard is not attainable, specific equipment and/or device adaptations may be needed to assist the student in these physical activities.

When planning such adaptations, consider carefully each student's capabilities, physician's guidelines for activity, and safety -- along with the student's interests and feelings. With such considerations likelihood of creating an adaptation that is functional, safe, and readily accepted by this student is greatly enhanced. Important considerations for developing adaptations follow.

GUIDELINES FOR MAKING ADAPTATIONS

Adaptations should be within a student's ability range. An adaptation should assist a student participate successfully in planned activities within his/her ability range. As a student's skill increases it may be necessary to modify further or eliminate an adaptation to encourage continued progress in student development.

Adaptations should allow a student to participate within guidelines established by his/her physician. Adaptations must be made that encourage a student to stay within activity limitations established by his/her physician while at the same time allowing the student freedom to participate within his/her ability. As a student uses an adaptation, attention must be given to possibilities of new problems being created. Since aggravation of other existing conditions is a possibility, frequent reevaluation of an adaptation as used by a specific student is necessary; appropriate adjustments are made when necessary.

A student should participate in the development of an adaptation and be positive toward its use. Cooperation between teacher and student is necessary for the development of a successful adaptation. The problem must be studied together to create a successful adaptation that overcomes a student's specific limitations. Ongoing appraisal regarding an adaptation's use is necessary for continued student acceptance.

Adaptations should be constructed safely. In planning and constructing a device adaptation, student safety must be upper most in a teacher's mind. An adaptation should encourage student participation yet be safe for the user as well as other students with whom he/she participates.

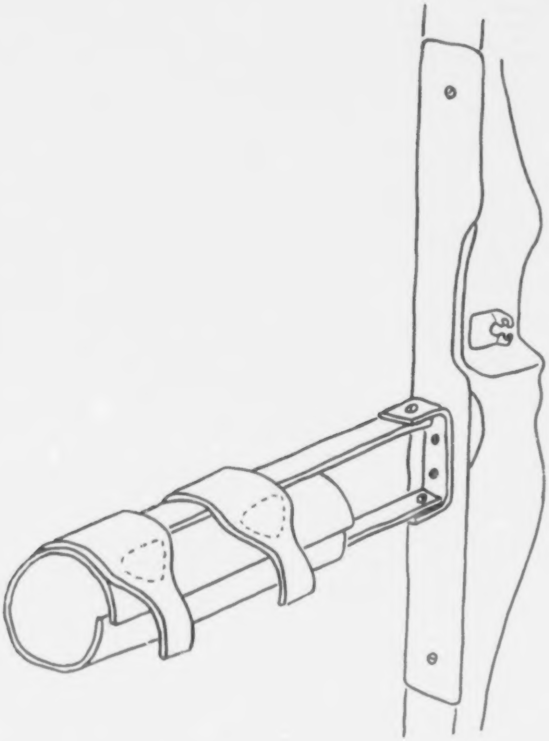
Adaptations should be made in activities appropriate to the student's age and interests. Each student should have opportunities to develop and use his/her abilities and capitalize personal interests. Since participation with non-disabled peers is a common desire, adaptations should be planned to encourage and allow this type participation.

In following sections, specific teacher-made adaptations for archery, badminton, and table tennis are described and illustrated. These adaptations were made following listed guidelines.

ADAPTATIONS FOR ARCHERY

Loss of Function of One or Both Hands

Inability to participate in archery due to paralysis of one hand led to the following solution. An adaption was added to the bow so that the bow's support was borne on the forearm of the affected arm. The other arm and hand were thus free to pull the bowstring.

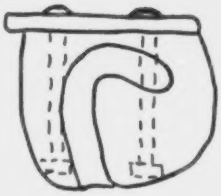


ADAPTED ARCHERY BOW, ILLUSTRATION

Construction of Adapted Archery Bow

- Cut a 3/16" thick piece of aluminum in the shape of the belly of the bow.
- Drill holes into the bow so fasteners can be inserted.
- Bolt the aluminum to the fasteners.
- Cut and shape a strip of aluminum 3/4" wide by 1/8" thick and the approximate length of the student's forearm.
- Bolt one part of this aluminum strip to the aluminum attached to the belly of the bow.
- Adjust the other ends so they fit into the pockets of a leather forearm support made to fit the student's forearm.
- Use velcro to hold the forearm support snugly in place.

This adapted archery bow was also used for a student who lacked ability to grip with either hand but had use of a prosthetic hook on one hand. A release aid was made to fit the pupil's prosthetic hook which allowed him to pull comfortably and release the bowstring while the adapted bow was secured to the other limb. With both equipment modifications students successfully participated in archery activities with their classmates.



ARCHERY RELEASE AID, ILLUSTRATION

Construction of Archery Release Aid

- Shape and groove a 3/4" piece of wood.
- Cut a 3/4" wide by 1/8" thick piece of aluminum approximately 1/8" longer than the wood and place it flush at one end with the wood.
- Bolt the aluminum piece securely to provide a firm surface from which the bowstring can be pulled back and easily released.

Limited Upper Limb Strength and/or Coordination

A desire to have a teen age boy with muscular dystrophy participate in activities with his peers led to creation of a different type of adapted bow. This student was only able to move forearms, wrists, and fingers independently. A bow was constructed so that after the teacher initially placed the string into a release aid[1] all that was necessary to free the string was slight finger pressure on the trigger of the release aid. This bow was mounted on a camera tripod to allow the student with the help of the teacher to make vertical and horizontal aiming adjustments. This made it possible for the young man to zero-in accurately on the archery target.

Construction of Adapted Bow

- Cut a 3/16" thick piece of aluminum in the shape of the belly of the bow.
- Drill holes into the bow so fasteners can be inserted.
- Bolt the aluminum to the fasteners.
- Cut a section of wood 1 1/2" by 1 1/2" the approximate length of the draw for a 12 pound pull bow when using a 26" arrow.
- Shape a piece of 1/8" aluminum to join the 1 1/2" by 1 1/2" strip of wood to the bow.

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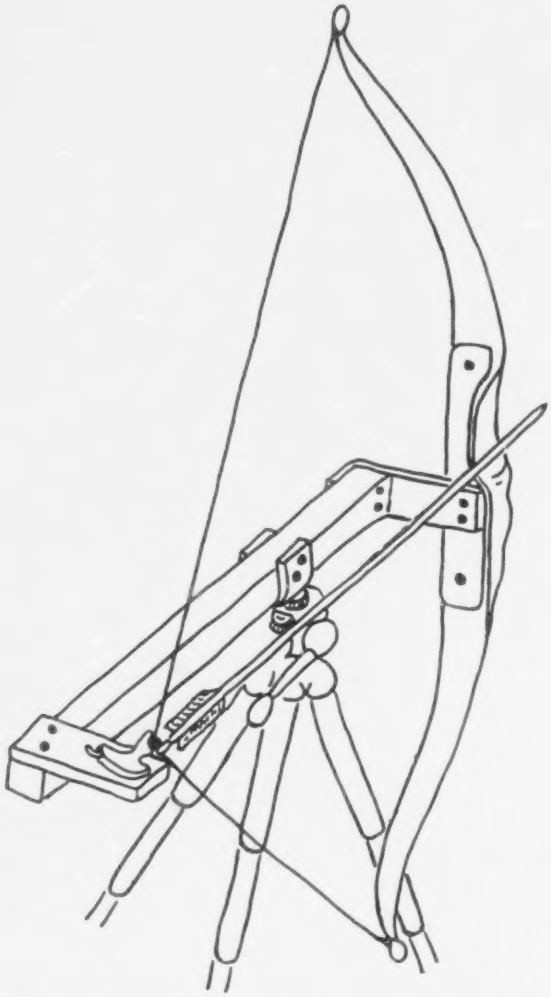
[1] Trade name of this release aid is Hot Shot Release, manufactured by Stuart Manufacturing Company, Rockwell, Texas.



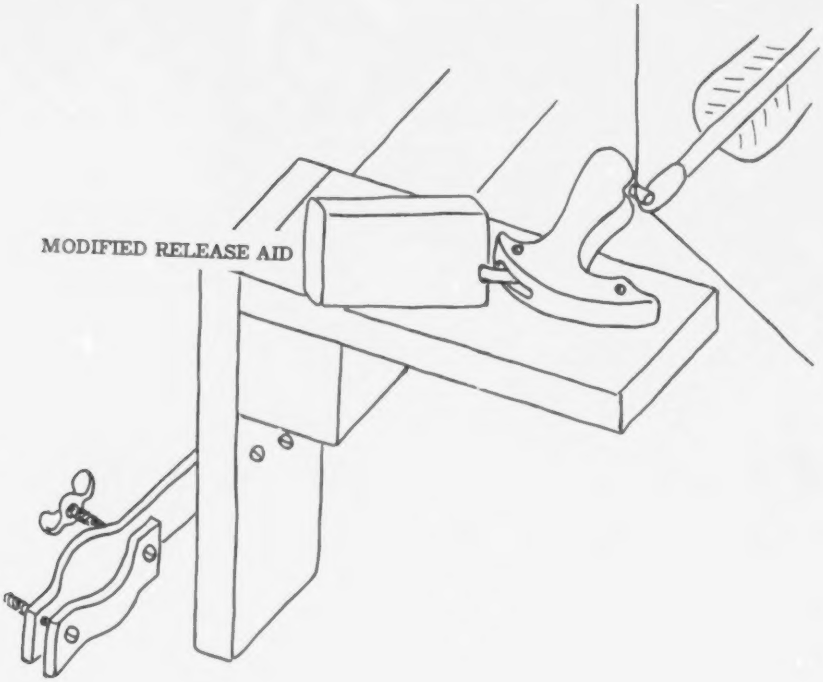
ADAPTED ARCHERY BOW, ILLUSTRATION

- Bolt one end of the aluminum to the end of the wooden strip and the other to the aluminum that is secured to the belly of the bow.
- Bolt the release aid to one end of a 3/4" by 2" piece of wood cut to a length which places the release device in a straight line with the bowstring.
- Bolt the other end of the wood to the 1 1/2" by 1 1/2" wood strip.
- Locate the center of gravity of the 1 1/2" by 1 1/2" wood strip with bow and release aid attached.
- Bolt a 1/8" U-shaped piece of aluminum with a camera screw to the bottom of the U and attach it with bolts to the wood strip at its center of gravity. The camera screw provides a means for easily securing the archery bow device to the camera tripod.

A pupil, as a result of cerebral palsy, lacked sufficient upper limb control to hold an archery bow and shoot an arrow. The adapted bow (described above) was used with two modifications--

- Secure the bow to the student's wheelchair to add stability to the bow in case he accidently hit it as a result of uncontrolled limb movements.
- Add a small wooden block to the trigger of the release aid to permit use of a finger for initiating release of the bowstring.

Both modifications encouraged the student to participate actively within his ability.



METHOD OF SECURING ADAPTED ARCHERY BOW TO WHEELCHAIR. ILLUSTRATION

Method of Securing Adapted Bow to Wheelchair

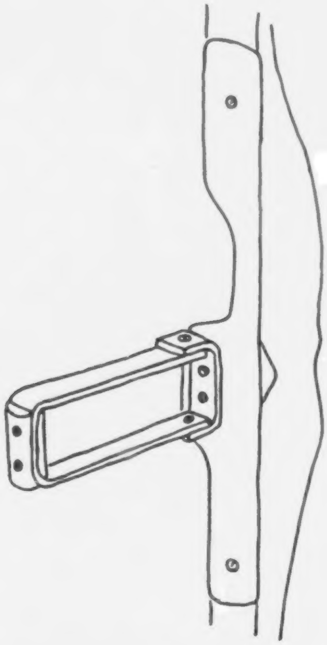
- Bolt the end of a piece of wood 5/8" thick, 2 1/2" wide, and 8" long perpendicular to the end of the adapted bow frame.
- Attach a 1/8" thick, 3/4" wide, and 7" long aluminum strip at a right angle to the wood strip.
- Secure the bow to a portion of the wheelchair frame by bolting it between this strip and a smaller aluminum strip.
- Use wing nuts for making this attachment since they permit quick vertical bow adjustments to foster consistency in hitting the target.

Construction of the Modified Release Aid

- Use a piece of wood 3/4" thick, 1 1/2" wide, and 2 3/4" long to construct the modified release aid.
- Drill a hole the same diameter as the trigger into the lower part of one end of the piece of wood.
- Slip the wood onto the trigger of the release aid.

Upper Limb Absence

A student with almost total absence of his upper limbs wanted to participate in archery. He had functional hands at the end of short appendages. Through experimentation it was noted that this student had sufficient strength and coordination to control a light laminated bow. However, he was unable to pull the bowstring back far enough to generate force required to hit the target. An extended handle was attached to the bow to place the bow further from the student and allow him an opportunity to pull the bowstring over a greater distance so as to provide sufficient force for arrows to reach the target. With use, the extended handle has proven to be a very satisfactory bow adaptation.



EXTENDED ARCHERY BOW HANDLE, ILLUSTRATION

Construction of Extended Bow Handle

- Cut a flat sheet of 3/16" aluminum somewhat in the shape of the belly of the bow. Note the shape of the aluminum sheet where the extended handle attaches; this is done to offset the handle so the released string does not hit the student's fingers.
- Drill holes into the bow so fasteners can be inserted.
- Bolt the aluminum sheet to the fasteners.
- Cut, shape, and bolt together two strips of aluminum 3/4" wide by 1/8" thick to form the frame of the handle extension.
- Bolt the extension to the flat piece of aluminum which has been attached to the belly of the bow.
- Cut lengthwise into two equal parts a small piece of dowling 3/4" in diameter.
- Bolt one-half of these pieces to each side of the extension to provide a handle by which the bow can comfortably be held.

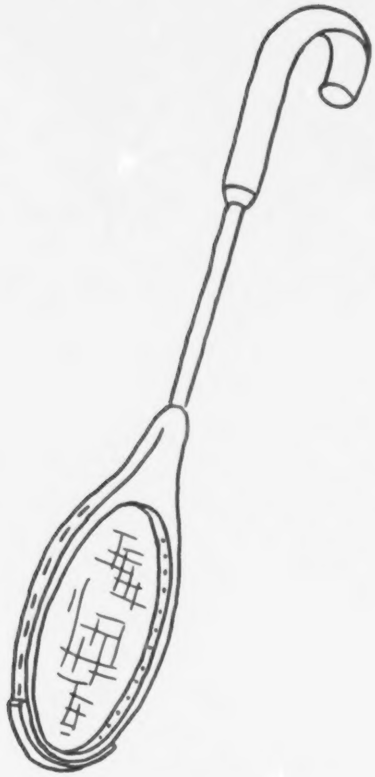
ADAPTATIONS FOR BADMINTON

Lack of Body Balance

A high school student requiring crutches to walk could move about with only one crutch on a badminton court. This allowed him a free hand to swing a badminton racket. Periodically when he took a good swing at a shuttle he would lose balance. His first reaction was to place the top of the racket on the floor in an effort to regain body control. However, the racket top would slip on the waxed floor and cause him to fall. To prevent further falls, a strip of rubberized material was attached to the racket top. Then the original handle was removed and replaced with a cane handle to provide greater racket control when it was used as a crutch. With use, this adapted badminton racket proved to be effective in assisting the student maintain body balance and did not detract from his ability to swing the racket.

Construction of Cane Handle Badminton Racket

- Saw off the handle portion of a walking cane.
- Drill lengthwise into the cane handle a hole slightly smaller in diameter than the racket's metal shaft.
- Remove the original wooden handle from the badminton racket and twist the cane handle onto the exposed shaft.
- Cut a strip of soft rubber the width of the racket frame and approximately 10" in length.
- Glue this rubber strip to the top of the cane handle badminton racket.



CANE HANDLE BADMINTON RACKET, ILLUSTRATION

Another student who also needed a crutch to help maintain body balance while playing badminton periodically lost balance while attempting to retrieve a shuttle from the gymnasium floor. By gluing velcro strips[2] to a shuttle and to the top of the racket, this student was provided a practical means for recovering the shuttle from the floor without likelihood of falling. Addition of the velcro to the shuttle did not seem to affect adversely its flight.

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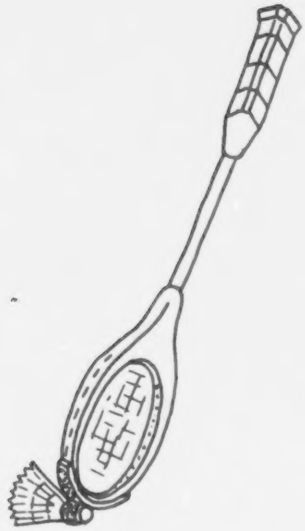
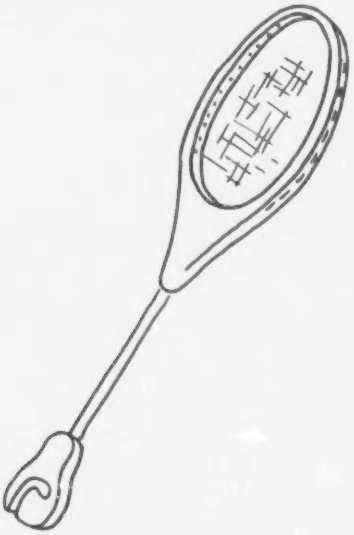
[2] Hollis F. Fait and Jay S. Shivers, Therapeutic and Adapted Recreational Services, Philadelphia: Lea & Febiger, 1975, p. 341.



BADMINTON RACKET AND SHUTTLE WITH VELCRO ATTACHED, ILLUSTRATION

Loss of Function of Both Hands

An adapted racket made badminton a reality for a student with congenital amputations of both upper limbs. Since this pupil used prosthetic hooks to aid her in performing daily living tasks a badminton handle was constructed that could be gripped with one of her hooks. As a result of the adapted racket this pupil developed the ability to rally on a reduced playing area with an underhand stroke.



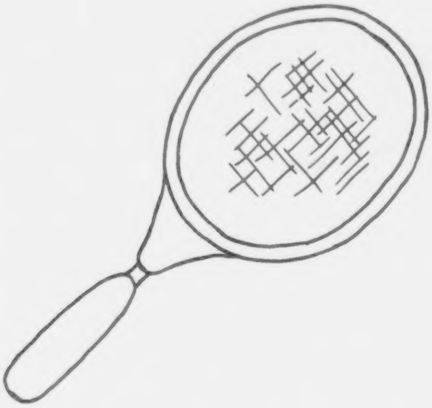
ADAPTED BADMINTON RACKET, ILLUSTRATION

Construction of Adapted Badminton Racket

- Construct the adapted badminton racket handle from a piece of wood 3/4" thick, 2 1/2" wide, and 4" long.
- Draw an outline of the hook onto the wooden handle.
- Use a knife to carve out the hook design to approximately 3/16" deep.
- Drill into the adapted handle a 2" hole slightly smaller in diameter than the racket's metal shaft.
- Remove the original handle from the badminton racket and twist the adapted handle onto the metal shaft.
  Note. The appropriate position for the face of the racket in relation to the adapted handle is determined through practice. This adjustment is made by turning the racket face to the proper angle while firmly holding the handle.

Poor Eye-Hand Coordination

Some students have difficulty hitting a shuttle with a standard badminton racket. By using a racket with a shortened handle the shuttle is brought closer to the student's hand so that greater success is experienced. As each pupil's skill increases, he/she should be encouraged to use a regular badminton racket.



SHORTENED BADMINTON RACKET, ILLUSTRATION

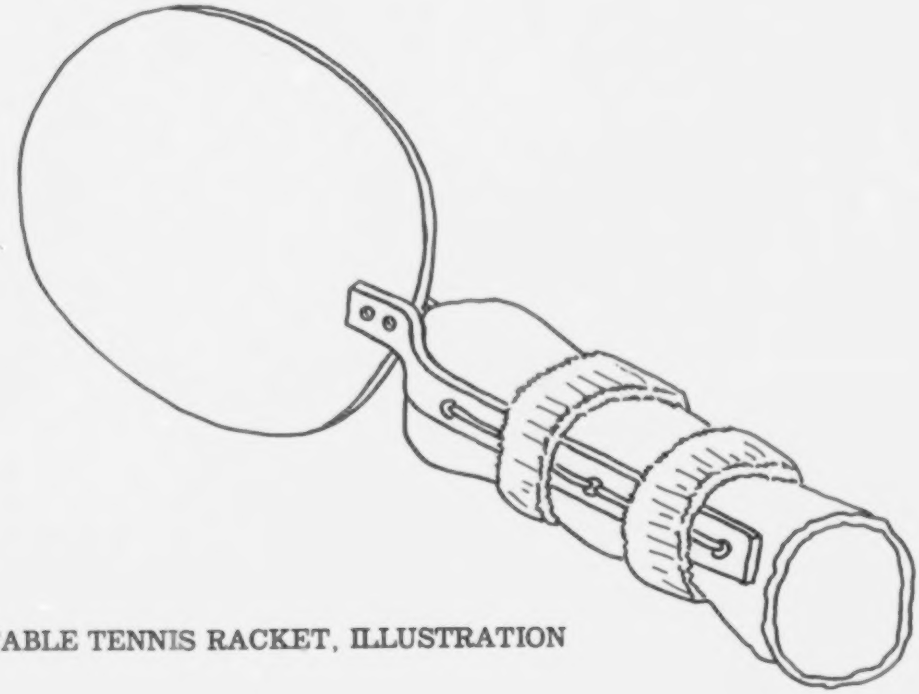
Construction of Shortened Badminton Racket

- Use a piece of dowling 5" to 6" long and approximately the same diameter as an ordinary badminton handle as the handle for a shortened racket.
- Drill lengthwise into the dowel a 2" hole slightly smaller in diameter than the racket's metal shaft.
- Remove the handle of a regular badminton racket leaving 2 1/2" to 3" of the shaft.
- Twist the dowel onto the shaft of the racket to complete the shortened badminton racket.

ADAPTATIONS FOR TABLE TENNIS

Loss of Function of Both Hands

A student without fingers on either hand who had a sensitive skin condition was able to participate effectively in table tennis with the aid of an adapted table tennis racket. This adaptation fit onto the student's hand and wrist.

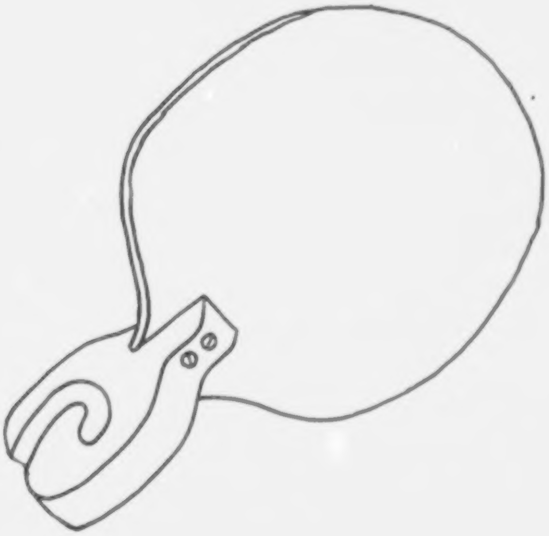


ADAPTED TABLE TENNIS RACKET, ILLUSTRATION

Construction of Adapted Table Tennis Racket

- . Make the hitting surface of the racket from 1/4" plywood.
- . Make the two side supports -- handle -- from aluminum strips 3/4" wide by 1/8" thick and slightly longer than the hand and wrist.
- . Bolt these supports to the racket.
- . Secure a snow mitten of soft quilted material with the thumb removed to the aluminum strips by nylon string.
- . Place elastic strips around the combined aluminum supports and mitten to provide for more secure adherence to the hand and wrist and greater racket control.

A few months into the school year the above mentioned student was fitted with a prosthetic hook for his left arm. Wishing to encourage this student to use the hook in recreational activities, a table tennis bat was constructed as shown below. This bat, as well as the racket described earlier, has been very useful to this student. On days when the student's prosthetic device irritates his skin he uses the racket described earlier; on other days he uses the adapted bat for his prosthetic hook.



ADAPTED TABLE TENNIS RACKET, ILLUSTRATION

Construction of Adapted Table Tennis Bat

- Make the striking surface from the same material as described above.
- Bolt to the blade a small handle made from a piece of 3/4" thick wood.
- Draw an outline of the hook onto the wooden handle.
- Use a knife to carve out the hook design to approximately 3/16" deep. This adaptation permits the student to hold securely the bat while playing table tennis.

Poor Eye-Hand Coordination

For a few students who had difficulty rallying while using a regular size table tennis ball and racket, a larger ball and bat proved to be effective substitutes. The larger ball was the size of a tennis ball and was made from a spongy foam material.[3] The racket was the same shape as a regular bat but with a much larger playing surface. Some students, as their skill increased, were able to use satisfactorily a regular size ball and racket.

Construction of Large Table Tennis Bat

- Cut from a 1/4" sheet of plywood a large bat with a playing surface of 8 1/2" in width and 11" in length.
- Glue pieces of wood 5/16" thick, 1 1/8" wide, and 7" long to each side to give body to the handle.
- Sand the handle to get a rounded surface for ease of gripping.

Lack of Mobility

A student unable to bear weight on one leg sat in a chair to participate in table tennis. He desired to use regular table tennis tables without modifications such as vertical side supports to keep balls on the table. To retrieve a ball when it went out of play onto the floor, a ball retrieval device was of real assistance. With this device the student bacame proficient in recovering a ball off the floor when it was within twelve feet. To recover a ball the student simply extends the telescopic handle to where the ball is located and rakes the ball to an area accessible for using the retrieval device; using slight pressure he then applies the device to the ball and recovers it. The telescopic handle is quickly retracted and the ball is one again available for continued play.

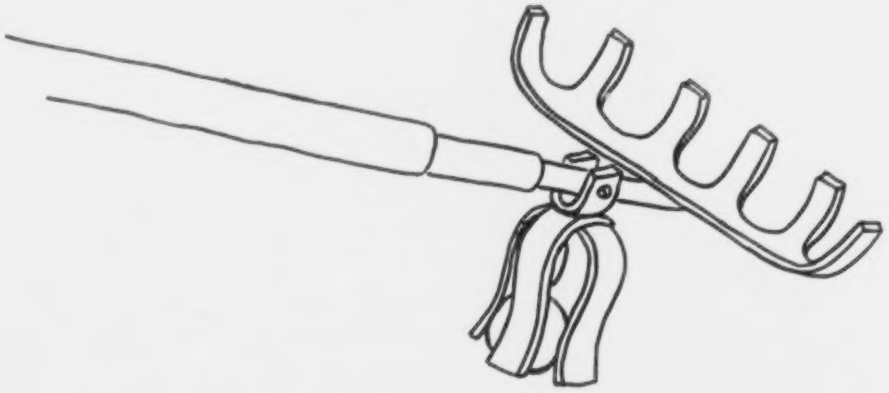


TABLE TENNIS BALL RETRIEVER, ILLUSTRATION

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[3] Trade name of foam ball used was All Ball, distributed by TR Inc., West 2563 Greer Road, Palo Alto, California 94303.

Construction of Table Tennis Ball Retriever

- Obtain a golfer's rake (used to retrieve golf balls from water hazards) with a 12-foot telescopic handle so that it can be adapted for recovering table tennis balls.
- Add to the opposite side of the rake the table tennis ball retriever.
- Make the ball retriever from two pieces of metal cut from a metal band normally used to bundle lumber for shipping; these bands can be obtained from lumber yards.
- Shape these metal bands with pliers; light bands work very well for this purpose as they hold their shape and retain a springy quality.

SUMMARY

Guidelines for making adaptations has been included to provide practical points to be considered when planning device adaptations. Examples of teacher-made devices have been discussed to demonstrate successful adaptations that have been developed using these guidelines. It is hoped that this information encourages you to use enthusiastically your imagination, resourcefulness, and creativity to develop meaningful adaptations for functionally limited students desiring to experience the joy of participating in meaningful physical education, leisure-time, and sport activities.

PRACTICAL POINTERS

TEACHING TENNIS TO STUDENTS WITH DISABILITIES

Randy Hester
and
Brad Parks

The United States Tennis Association (USTA) is committed to providing every child in America, regardless of ability or disability, with opportunities to participate in the lifetime sport of tennis. Unfortunately, many people still believe tennis is too difficult or technical to be taught to individuals who are physically or mentally challenged. The simple fact is teaching tennis to special populations isn't any different from teaching a regular physical education class. Basic principles of tennis instruction remain the same, but as with any teaching situation, the instructor must make some minor modifications for a specific individual or group.

Why Tennis?

Of all programming options available, what sets tennis apart from the rest? The following are a few reasons tennis should be part of activity programs for persons with disabilities--

Independence. Tennis teaches many valuable life skills, not the least of which is independence. When playing tennis, each player is responsible for one's own performances and results. To improve and succeed, students must develop their abilities to be self-motivated and self-reliant.

Cooperation. Tennis also teaches cooperation. In fact, tennis does not exist without cooperation because so few matches are played using officials. Players must call their own lines and even make calls against themselves. This requires a great deal of trust and teaches cooperative skills which serve participants well in any endeavor.

Social Interactions. Tennis is played by hundreds of thousands of people throughout the world. Learning and playing tennis provides individuals who are mentally and physically challenged excellent opportunities to be integrated into recreational tennis activities in their communities. This also serves to enhance the image of persons with disabilities by showing they can play a game that, while considered difficult, can be played by nearly everyone.

Principles of Instruction

Regardless of audience, it is important to understand a few fundamental principles of racket control, ball control, and readiness to introduce basic tennis skills.

Racket Control

The most important element of any tennis skill is the contact point--the point at which ball meets racket face. Regardless of a player's stroke pattern or body position, the ball goes wherever the racket face is pointing at contact. The grip a student uses greatly influences racket face angle at contact point. Therefore, it is essential students know and use the proper grip for each skill.

Ball Control

Once students are able to grip a racket properly, they need to learn how to control the ball they are striking. Here are four key concerns to help students learn and improve control of a tennis ball--

Height--Tennis is a net game. Therefore, the first challenge for any stroke is to get the ball over the net. Height of a tennis ball is controlled by opening or closing the racket face. An open racket face is pointed toward the sky (palm up), while a closed racket face is pointed at the ground (palm down). By contacting the ball with a slightly open racket face, students get the ball high enough to clear the net. If a ball is continually hit into the net, instruct that student to open the racket face slightly at the contact point.

Direction--Help students learn how to place a ball in different parts of the court to move opponents around. Again, angle of racket face at contact controls direction of the ball. So, teach students how to contact a ball with the racket face pointed to the right (the ball goes right), and to the left (the ball goes left). Then they can keep opponents on the move.

Depth--To keep an opponent from attacking, a player's shots must land deep in the court. The easiest and most consistent way for students to get sufficient depth on their shots is by hitting the ball higher over the net. Work with students so they can achieve sufficient depth without hitting shots beyond the line.

Power--Shot placement is more effective if a ball gets to the spot quickly, making it difficult for an opponent to return. Speed at which a ball travels is determined by size and speed of swing used to stroke the ball--a short, slow swing produces a weak return; a large, fast swing generates a great deal of pace. However, warn students as they increase power of their strokes they decrease abilities to control shots.

Readiness

Since each student and disability is different, it is important to adjust approaches to teaching tennis accordingly. The key concept is readiness. We all know the cliche about walking before running, but if a student is not ready for tennis skills, then forcing the issue can be an unpleasant experience for both teacher and student. Playing tennis involves some extremely sophisticated movement and striking skills. Here is an example of some prestriking and striking skills in a probable order of development--

1. Throwing
2. Catching a large ball
3. Kicking
4. Catching a small ball
5. Punting
6. Dribbling
7. Striking an immobile ball
8. Striking a moving ball with a paddle
9. Striking a large ball with a short racket
10. Striking a smaller ball
11. Striking with a longer racket

Advancing a student who has not mastered basic throwing and catching skills into swinging a racket at a tennis ball would be like putting a student learning to add and subtract into an algebra class. By checking for readiness a tennis teacher can design appropriate activities.

Pre-Tennis

With lower skilled students, activities often are best geared to training appropriate movement skills such as running, chasing, balancing, transferring weight, and jumping and landing. At the same time, prestriking and striking skills should be at appropriate levels as suggested by the list above.

Ready to Begin

Once a group of students is assembled and ready for their first tennis experience, consider these general factors when planning activities--

Safety Is #1!--A student's eagerness to swing a racket combined with a possibly low level of spacial awareness can create serious potential for disaster. Therefore, safety rules stated at the very beginning of each class session are imperative.

Make Everyone Successful--After checking readiness, divide a class into small groups of nearly equal skill levels. Some students require activities which develop Pre-Tennis Skills, some Introductory Skills, and some Basic Skills (refer to the section on Lead-Up Activities and Games included in this POINTER). From there, begin each activity at a level where everyone can succeed. Follow these basic principles for success--

... Shorten/lighten the racket. Plastic paddles or racket ball rackets are two inexpensive equipment options to allow greater control.

... Slow/large ball. Balloons and large foam balls are a couple of examples of objects which move slowly and are much easier to hit.

Make Lesson Educational--Demonstrate rather than explain an activity. Descriptions should be brief but specific.

Keep Things Positive--Be generous with descriptive feedback, and if you must make corrections, make them in a positive manner, i.e., "Johnny, you really took a nice looking swing at that one. Now, I bet if you slow down your swing a little you'll be able to make contact." Also, make certain you reward effort, not just achievement.

Make it Fun!!!--Remember, you are giving students opportunities to play, not training world class athletes. Be energetic and encourage a playful atmosphere where students may participate and explore different tennis activities. Each class should be fun so every student feels comfortable and wishes to participate.

Short Tennis for Individuals with Disabilities

We are all accustomed to sports that have been modified for children. Little League fields are smaller. Grade schools often have eight-foot, instead of ten-foot basketball hoops. Youth soccer is played on a reduced field. Yet we seldom see such formal adaptations of tennis courts.

It is true teachers of tennis know beginning students need smaller and shorter rackets, and they usually keep these students close to the net. Many times beginners are encouraged to play mini tennis, using just the four service boxes. But limitations of this adaptation are clear. A tennis court is still needed. If a tennis court is available, use of the forecourt is inefficient with four students using less than a third of the entire fenced area. Plus, it just does not feel like real tennis.

Short tennis is played on a court approximately 20 feet by 40 feet (a regulation tennis court is 36 feet by 78 feet), using rackets 18 to 25 inches long (compared to the standard 27 inches), and taking advantage of foam and low-compression balls.

The notion of short tennis is simple--modify court and equipment to ensure immediate success while making most efficient use of current facilities. Students with disabilities not only have more success in learning the game, but many can play almost immediately.

Playing Area

Tennis courts, paved areas, or gym floors are ideal surfaces. Short tennis can also be set up on packed dirt, or even on grass. Short tennis courts are most often made by dividing a regulation tennis court into four short tennis courts as shown in Figure 1.

Figure 1

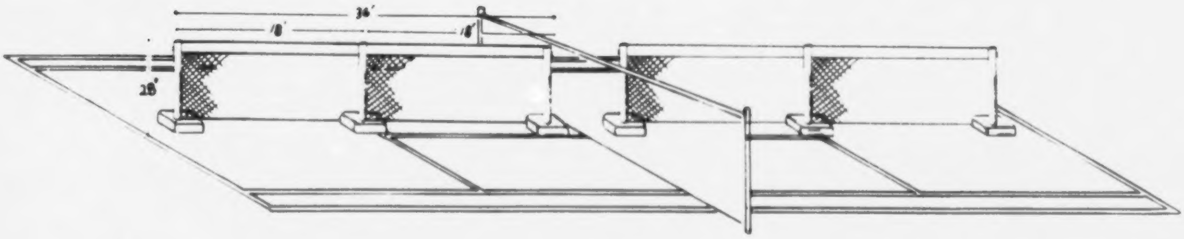
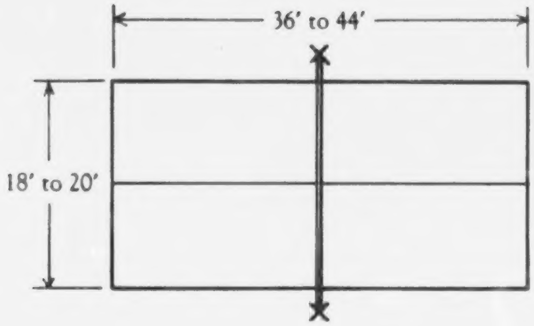


Figure 2



Regulation sidelines become baselines while regulation baselines and service lines act as sidelines.

The game works well on any surface which accommodates a court 18 feet to 20 feet wide by 36 feet to 44 feet long as shown in Figure 2. Temporary lines can be taped indoors or chalked outdoors. Service areas can be designated by splitting the court down the center.

Ideally, the court boundaries should have at least six feet of space behind each end of the court, and the same distance between courts is desirable.

Net and Standards

Any light-weight net that can cover the 18 to 20 foot width will do. A badminton net is fine. It is possible to improvise by using a rope with streamers attached. The net should be about 2 feet 6 inches high in the center. Commercial nets and standards made specifically for short tennis are available. Existing standards for volleyball and other activities work fine.

Rackets

Small rackets work best and are safest, especially for doubles. Racket length can vary from racquetball size (18 inches) to regular junior rackets at 25 to 26 inches. Full-size rackets can be used, although they are not recommended in doubles.

Balls

Experience indicates foam balls are best initial choice for indoor or windless outdoor play. Students enjoy graduating to low-compression balls (or when not available, dead or punctured tennis balls). Since foam balls get out of control with even a light wind, heavier low-compression balls are best choices for outdoor play.

Lead-Up Activities and Games

Activities in this section can be used when introducing tennis to students of any disability. Check for readiness to determine whether pre-tennis, introductory, or basic skills activities should be used.

Pre-Tennis Skills

Two Balls (no racket). Attempt to dribble two tennis balls simultaneously, one ball in each hand. Variation--toss two balls in the air simultaneously, one ball in each hand.

Circle Dribble (no racket). Circles (three feet in diameter) are drawn or hoola-hoops placed on the court. Students hop in and out of circles while dribbling a ball. Variation--use two balls at the same time.

Arches. Any number of students are positioned around the court. Each student simply tosses a ball back and forth over his/her head with both arms extended.

Chain Tag. Up to 20 can play using half a court. One designated student (let students determine) must tag another student. Tagged student then joins hands with designated student and they work as a team. The chain becomes longer and longer until all students are caught.

Cats and Rats. Divide class into two teams, one called cats, the other called rats. Each cat pairs off with a rat. Each pair stands about six feet apart. Call "cats," and cats try to catch rats who can only run in straight lines toward the side fence. After a few steps, call "rats," who then turn and become pursuers. When done well, both students can change directions several times before being caught.

Hunter. Run across the service line one or more times. Students, armed with tennis balls, try to hit you using an overhand throw. Caution--you may wish to use foam balls, and with older students use the baseline!

Racket Quickness Drill. Students pair off with partners and stand in two lines facing each other. One partner balances a racket on the ground (racket head down while holding the grip). When you call "go," that partner lets go and their opposite runs to catch the racket before it hits the ground. Gradually increase distances between students.

Racket Quickness Circle. Students stand in a circle and do the same drill as above, but run to left on command.

Variation--students run counterclockwise; call "left" or "right" so students move accordingly.

Create-A-Drill. Ask the class to Invent ten different ways to toss and catch a tennis ball. Note--students should invent many clever variations such as tossing and/or catching behind the back, under the leg.

Rain of Balls. Position an even number of students on each side of the net. Each team has an equal supply of balls. The game lasts 60 seconds. The object is for students to get rid of all balls on their side as quickly as possible. When time is called, team with the fewest balls on its side of the net wins.

Pick-Up-Drill. While sitting on the court, pile as many balls as possible on your racket, and fling them up in the air. The object is to see how fast students can collect the balls and bring them back. Tennis balls may be thrown in any direction.

Ducking and Jumping. Students line up on baseline facing the net. Run back and forth with your racket a few inches above the ground, or just below tops of students heads. They duck or jump accordingly. Note--do this carefully to avoid hitting anyone with a racket.

Tossing Drills. Toss a ball to a student (in all directions, left, right, back, forward) who must catch the ball in the air and toss it back. This activity simulates movement on the court. Students can also do this drill together.

Spin Game. Students pair off and stand about nine feet apart. They must toss a ball back and forth with a bounce in the middle. Students must spin around (360 degrees) after each toss. Have each pair count number of consecutive catches it can make.

Introductory Skills

Racket Pass. Students in open formation, on command, pass a racket from one hand to the other, around the body, under one leg, and then under the other leg. Repeat the sequence one or more times with variation in order of commands.

Racket Relay. Divide class into teams of five to ten. Teams are placed against one fence or wall the length of the playing area. Each student has to walk, run, or skip to the far side of the playing area, pick up a racket, and return.

Walk the Dog. Students spread about the playing area and begin to roll a ball gently with the racket in any direction. "Take your ball for a walk around the gym, keeping it close to your racket at all times, like an obedient little dog."

Pattern Roll. One at a time, have each student roll a ball along specified lines on the playing surface or around various obstacles.

Line Roll with Partner. Divide students into pairs which stand face to face or side by side on a line about six feet apart. Using one racket students roll the ball back and forth along the line. After five successful passes without losing the ball, have students use opposite face of the racket. When students have succeeded with both faces, have them take one step back.

Racket Balance. With students in open formation, have them balance a ball on the racket. The racket should be held steady so the ball does not move.

Racket Roll. Students roll a ball around the racket face.

Ball Pass. Divide the class into pairs. Partners pass a ball back and forth from racket to racket, first by guiding the ball with the free hand, and later without touching it.

Circle Pass. Place students in circles of four to six students, and have them pass the ball from one to another racket to racket.

Caterpillar. Four students are in a row side by side. The first student passes a ball to a teammate (racket to racket), then goes to the other end of the line passing behind the team. See which team can complete a full turn. The game can become competitive in the form of a relay. Place the first member of each team on a starting line. The object is to be the first team to arrive at a designated finish line caterpillar fashion without dropping the ball. When the ball is dropped the whole team returns to the starting line where the ball is again put into play. This game can also be played over to a given point and back again to the starting line.

Basic Skills for Beginners

Racket Skills. Students in open formation attempt various racket skills such as controlled dribbling of the ball with the racket (racket bounce), dribbling in the air (ups), ups with a bounce in between, and ups alternating sides of the racket.

Drop-Hit-Catch Practice in Pairs. Catchers stand with their backs to the walls around the circumference of the gym. Hitters stand about 15 to 20 feet away from catchers, drop the ball, and gently hit it to their partners. To encourage controlled hitting, reward students for successful sequences.

Alley-Rally Game. This is played in pairs, requiring two rackets and three balls. Two balls are placed approximately four feet apart on the gym floor. Each student stands next to a ball, facing a partner. The third ball is put into play gently with a bounce-hit. The object is for the student to hit the partner's ball. Key cues--"bump," "tap," or "just touch" the ball. Rules--No spiking or hitting down. First shot (serve) does not count.

Toss-Hit-Catch. To practice forehand, divide students into pairs. The first exercise is a quick game of catch, with the ball caught on one bounce. Next, instruct one student from each pair to pick up a racket and begin bumping or tapping forehands into the hands of the tosser.

Backhand Bumps. This activity offers opportunities to practice simple backhands. Students are divided into pairs, one hitter and one catcher (catchers once again are distributed around the gym with backs to the wall). Hitter faces the catcher, places racket strings against the opposite knee, drops the ball in front of the racket, and lifts it toward the catching partner.

Wheelchair Tennis

Tennis is the fastest growing wheelchair sport in the world. Players of all disability levels, including quadriplegics, compete on national and international levels. Rules for wheelchair tennis are the same as for able-bodied tennis, except wheelchair players are allowed to let a ball bounce twice before hitting it over the net.

Special Equipment

To introduce tennis, students may use regular hospital wheelchairs. As they become more accomplished, they quickly realize need for sport wheelchairs. A light-weight sport chair with low or no arm rests makes mobility around the court much easier.

Quadriplegics often lack ability to grip a tennis racket effectively. There are several ways to aid a student with limited or no hand function in holding a racket. The most common way is by wrapping the hand with an Ace bandage. For the serious player, polyethylene devices molded to fit the hand, and which fasten to the racket handle, are available.

Wheelchair Mobility with the Racket

To move and stroke the ball effectively, students must learn to grip racket and push rim of wheelchair with the same hand. Teach students to take hold of their rackets using their fingers which overlap the grip to hold push rims. This allows them to maneuver their chairs and prepare for on-coming balls quickly.

Communicating with Students in Wheelchairs

Students in wheelchairs are no different from able-bodied students, except they happen to be sitting in a chair. There will be better understandings and closer relationships between you and students in wheelchairs if you treat them in the same ways as able-bodied students.

Coaching Tips for Wheelchair Tennis

Grip. The grip in wheelchair tennis is really no different than in regular tennis. However, since so many balls are struck relatively high to the body, many players tend to gravitate towards a semi-western grip on the forehand. This is ideally suited for balls hit at shoulder height or higher. One-handed backhands are the norm.

Ready Position. Wheelchair players should start one to three feet behind the baseline, racket in playing hand, and both hands on the wheels.

Forehand. For basic forehand groundstroke, the chair should be turned at a 45 degree angle to the net. Top wheelchair players often hit with moderate to heavy topspin to allow time to recover from a shot. Weight shift is also important in wheelchair tennis. Many right-handed players hold onto left sides of chairs with left hands for balance as they stroke balls, gaining power from shoulder rotations and slight leans toward the net.

Backhand. To teach backhand groundstroke, have students turn chairs sideways to the net. Like the forehand, most players achieve balance by placing non-dominant hands on opposite knees, sides of chairs, or arm rests. When unable to maneuver chairs sideways, students must use shorter underspin shots or bunt from positions facing the net.

Serve. Teach students when serving to position chairs at a 45 degree angle to the baseline. Both large wheels must be behind the baseline. The serving technique is no different than for an able-bodied player except after tossing the ball the tossing hand grabs the wheel for balance. Students with higher levels of injuries who have poor balance may have better luck starting with the racket behind the back, rather than taking a full swing.

Due to relatively low position of the server, top wheelchair players have learned advantages of using spin serves which clear the net by a high margin and spin down into the court. The spin serve can be a potent weapon because of an opponent's difficulty of lateral movement on the return, especially on wide breaking serves.

Service Return. Position students about one foot behind the baseline and two feet from the sideline. As the toss goes up the receiver should begin to roll forward so they are in motion as the serve is made. This enables the receiver to be ready for any necessary change of direction. The best way to return a strong serve is with a short, volley-like stroke.

Volley. Although wheelchair tennis is basically a baseline game, students in wheelchairs should be comfortable with the volley. This is especially true when playing doubles with able-bodied players. Players in wheelchairs usually position themselves close to the service-line for volleying so they are not as susceptible to lobs over their heads.

Tennis for the Hearing Impaired

While a hearing impairment does not affect a student's physical or mental coordination for tennis, it can affect a student's confidence when surrounded by those with full hearing capabilities. Nevertheless, students who are deaf can be incorporated into classes of hearing with only moderate difficulties. If possible, match two deaf students together so they may gain confidence from observing each other succeed at particular skills.

Communicating with Hearing Impaired Students

The key to communicating tennis instruction to students with hearing impairments is demonstration. Shorten all verbal explanations to the group and thoroughly demonstrate each new stroke or concept from a variety of positions. Demonstration can be enhanced through use of exaggeration. For example, demonstrate an obviously uncontrolled forehand swing and indicate lack of success by vigorously shaking your head. Next, exaggerate proper form for the forehand, and reinforce the demonstration with a smile or other positive gesture.

If verbal instructions are necessary for your class, the following suggestions will be helpful when teaching students with hearing impairments--

- To facilitate lipreading always face students when speaking.
- Attract a student's attention before speaking by tapping him/her lightly on the shoulder or by waving a racket.
- Stand close to the student and enunciate clearly with a regular tone of voice--do not shout.

- Rephrase sentences students do not understand, being sensitive as to whether or not the student has actually understood or is simply nodding in agreement to be polite.
- A chalkboard is helpful in explaining certain concepts to students.
- Use facial expressions and body language to demonstrate good and bad aspects of a student's technique and body positioning.
- Learn to use or enlist aid of someone who knows sign language. Demonstrate the skill, sign the explanation, then demonstrate again.

Tennis and the Mentally Retarded

Sport participation by athletes with mental retardation is growing at astounding rates, and tennis is no exception to the trend. Increasingly more people are realizing youth and adults with mental retardation can and do learn tennis skills if given opportunities.

Communicating with the Mentally Retarded

Speak to students with mental retardation in manners appropriate for their ages. An adult with mental retardation may have a mental age of five but this person is an adult. Do not use the same teaching styles as you would for little kids.

Of most importance is to make every effort to understand what students are saying to you. Some students with mental retardation may be hard to understand due to their styles of speech. If you can not understand what a student is saying to you, do not be embarrassed. Do not just nod and smile either. Tell the student you are having difficulty understanding and ask him/her to repeat the question or comment more slowly. If you still can not understand, ask another if he/she understands what is being said.

Coaching Tips for the Mentally Retarded

Approach. Interact with your tennis class as you would with any class. You are teaching tennis students; they just happen to be students with mental retardation. Above all, do not be reluctant to challenge students, both technically and physically. Help students set appropriate goals that they can rise to.

Safety. Students may have slower reaction times than others you have been used to teaching. Bear this in mind when having students perform striking skills (can they react quickly enough to avoid being hit?), or when you have a lot of students performing an activity in a small space (can they react fast to avoid collisions?). Also, make certain all students are medically cleared to play tennis. Be aware of any medical situations which may affect a student during your classes (e.g. sensitivity to sun due to medication, history of seizures).

Instruction. Focus on teaching fundamental skills and basic game understanding. Be careful about introducing complex tactical concepts. Recognize and reward effort, not just accomplishment, particularly for a lower skilled student. Also, do not get over involved with static mechanics of skills. While it is useful to break down a skill into its technical components, particularly for lower skilled students, always build into some kind of dynamic situation.

Groups. Whenever possible, break a large group into small learning groups. You may be asked to teach a group that is diverse in age, physical size, speed, and ability. When students are asked to play against each other, make sure to match students for size and skill. Safety must be a primary concern.

Competition. Students want to play, not just develop technical skills. For lower skilled students who may not be ready to play full-court games, use modified games and activities which are challenging and competitive.

Conclusion

Students with disabilities deserve to have every opportunity to learn and participate in lifetime sports. Teaching tennis skills to students who are mentally or physically challenged gives them abilities to reap tremendous benefits of pride, self-esteem, and achievement so often associated with sport participation.

Additional Reading

Parks, B.A. (1988). *Tennis in a wheelchair*. Princeton, NJ: United States Tennis Association.

United States Tennis Association. (1987). *Special Olympics sports skills guide for tennis*. Washington, DC: Special Olympics International.

USTA schools program tennis curriculum. (1989). Princeton, NJ: United States Tennis Association.

USTA short tennis handbook. (1988). Princeton, NJ: United States Tennis Association.

Organizations

National Foundation of Wheelchair Tennis (940 Calle Amanecer, Suite B, San Clemente, CA 92672).

Special Olympics International (1350 New York Avenue, NW, Suite 500, Washington, DC 20005).

United States Deaf Tennis Association (Gallaudet University, P.O. Box 1986, Washington, DC 20002, FAX 202-394-2148).

United States Professional Tennis Association (P.O. Box 7077, Wesley Chapel, FL 34249).

United States Professional Tennis Registry (P.O. Box 4739, Hilton Head Island, SC 29938).

United States Tennis Association (707 Alexander Road, Princeton, NJ 08540).

PRACTICAL POINTERS

Track and Field for ALL Persons

Susan J. Gavron

Track and field provides individuals with disabilities opportunities to participate in a wide range of activities, to improve fitness levels, and to be involved in local community recreational events on an integrated basis. Track and field events are available on the local level in school physical education classes, play days, and parks and recreation special events. Regional, state, national, and international level competition is available for those who are qualified. A young hearing impaired student who runs cross-country for a local high school may end up participating in the World Games for the Deaf while an individual with a visual impairment may represent the United States in wrestling or goal ball. Individuals with cognitive disabilities may become involved in community recreation activities such as bowling or tennis on a lifelong basis while others with physical disabilities may ski for the U.S. Disabled Ski Team or scuba dive in the ocean. All these opportunities however must start with physical education instructional experiences in the early lives of these individuals.

Public Law 94-142, the Education of All Handicapped Children Act (1975), provided initial impetus for instruction in sport, games, and intramural experiences in least restrictive educational environments for individuals with disabilities. No longer may a teacher or coach deny an individual with a disability opportunities to participate because of that disability. The Amateur Athletic Act of 1978 provided further impetus for competitive opportunities at national and international levels in both segregated and integrated settings. The most important aspect in both laws was the emphasis on opportunities for instruction and availability of competition in sport, games, and recreation for individuals with disabilities, women, and minorities. This POINTER contains information on facilitating track and field participation for ALL students.

FACTORS AFFECTING LEARNING

Rich (1990, 126-127) has identified four environmental factors to consider when teaching--sound, lighting, temperature, and organization. They are particularly applicable to track and field instruction for persons with disabilities.

Sound--Sounds within the learning environment can enhance or detract from attention to task. For example, when outdoors, extraneous sound can interfere with orientation of a visually or hearing impaired person in running and jumping events. Using voice or audio beeping devices can assist in orienting an individual with visual or auditory disabilities in the right direction. For an individual who is easily distracted, such as someone with learning disabilities or mental retardation, using flags for starting and stopping points as well as for boundaries is appropriate to keep them on-task.

Lighting--Lighting can affect one's level of stimulation. Individuals with hyperactivity may have increased levels of activity as a result of bright lights or sunlight. Wearing hats in the very bright sunshine and even indoors can reduce effects of such stimulation. For persons with sensitive eyesight, using sunglasses can reduce glare from the sun, bright lights, or even bright cloudy reflections. Using umbrellas as protection from bright light is also a popular technique with persons with vision problems and individuals with Down syndrome (who sunburn easily). Umbrellas also provide relief from the heat!

Temperature--Heat, humidity, and cold can have an effect on performance outcomes. An individual's thermomechanism (internal heat sensing mechanism) and tolerance for intensity and duration of activity will be affected by climatic conditions. For example, asthmatics have increases in attacks when there is cold, damp weather. Spinal cord injured individuals have to worry about frost bite they do not feel when involved in winter sports. Due to a decrease in body mass, amputees have to be concerned about hypothermia in long road races. Knowing how to dress appropriately for events, keeping ample water supplies handy, and being in shape can help reduce the negative effects of temperature on performance.

Organization--Safety, accessibility, general plan of movement, and equipment must be preplanned for maximum effect of time on task. Training and practice are essential for optimum performance results. It is important to check playing surfaces for holes, debris, or other material which may impede wheelchairs or cause one to lose one's footing. All equipment must be carefully examined each time prior to its use. Do not assume that equipment is in good, functional, and working order. Accessibility in track and field includes access to training room facilities, bathrooms, locker rooms, showers, public viewing stands, and, of course, the track and field venues themselves. Plan movement of individuals on the field. It is important, for example, that persons not walk across throwing areas for the javelin, shot, and discus. Plan practices. Multi-event individuals (which is common in track and field) should practice a set amount of time on each of their events each day or on an event a day basis.

Additional Considerations

Additional factors to consider which may affect learning and performance in track and field include--

Nature of the specific disability in terms of motor output. A teacher must understand the etiology (cause) of a disability and its effect on motor response or output. A good example is an individual with a cognitive disability such as mental retardation. This individual may need to follow another person around the track in order to stay on-task. An individual with ataxic cerebral palsy may be encouraged to start a race with a stand-up rather than a crouch start due to difficulty in balancing in a four point crouch start. Knowing that an individual with spastic cerebral palsy has more flexors than extensors involved may affect positioning for a throwing or running event. They may end up running the track backwards in a wheelchair rather than forwards because that way motor action is more efficient.

Nature of the specific sport or activity. Understanding the mechanics of throwing, running, or jumping events is essential to analyzing performance. Teachers must have underlying knowledge of biomechanics and strategies for each event. For example, an individual in a wheelchair may be coached to develop one of several different techniques for running (e.g., figure eight vs. continuous contact wheeling). It is also important for the teacher to understand the principles of drag on a turn and when to slingshot around another individual on corners (similar to car racing). Teaching throwers requires understanding optimum angles for release of objects (generally 45 degrees), the effect of speed of spin in the shot put and discus, and importance of the pivot. All teachers should have a knowledge of proper weight training techniques and how to execute flexibility exercises (don't bounce).

Capabilities and experiences of the individual and classmates. Experience in running, jumping, and throwing is an important factor in performance. Students who have not had opportunities to engage in these types of activities may have delayed or immature motor skill patterns. Fundamental locomotor patterns are necessary prior to development of more refined skills. For example, in order to teach someone how to sprint that person must run, just as in learning to walk one must first crawl, then stand, then walk. Gaining insight into the physical, recreational, and leisure activities of an individual and family is important to ascertain experiential level. The other side of the coin is to work with classmates of a child with a disability so they are sensitized toward the abilities and needs of the child. This is not meant to draw undue attention to the child with a disability but to assist ablebodied children in their acceptance of such an individual. With elementary school-age children the use of puppets with disabilities has proven an effective means to positively influence attitudes of children without disabilities toward those with disabilities. Older students may read books about athletes with disabilities, see slides and videos of accomplished athletes with disabilities, have a spokesperson from a local advocacy group come into class, or have a peer with a disability talk directly with them.

A teacher must also know and understand principles of motor learning (how individuals learn motor skills) as applied to track and field. Examples of such concepts include--

Individual differences exist between and among students. Do not expect all individuals to perform at the same level. Find the strengths of each individual and maximize them. Do not put children in events which are not suited for them. For example, having someone with osteogenesis imperfecta (brittle bone disease) work on field events associated with strength is inappropriate because such events are likely to increase fractures. Do not expect all students with similar disabilities to perform the same. For example, not all those with spastic cerebral palsy need to run backwards in a wheelchair or throw the discus or put the shot in reverse position. Allow for individual style in technique. Allow visually impaired individuals to stand directly in front of the high jump bar if that is the technique most effective for them. If a visually impaired person can see enough to run to the bar, have them count steps, or tie a ribbon on the bar so they can fixate on a target. Individualize!

Individuals have different styles of learning. It is important that a teacher determine how best an individual learns. Some people are visual learners; they learn by watching, then doing. Others are auditory learners who listen to directions and then engage in activity. Still others need a combination of listening, seeing, and doing. Manual manipulation through the range of motion is another way in which individuals can learn. This approach involves physically assisting students through the range of motion for a particular activity. In track and field this can mean manually assisting an individual with proper arm swing in a sprint, placing fingers correctly around a discus, or assisting foot placement in starting blocks and finger placements on the starting line. One can assist in the preparatory swing for the discus or the javelin throw. The most important concept to remember is to "try another way" if something does not work. In this case success (product) in terms of completion of a skill becomes more important than form (process).

Rates of learning will vary. Individuals learn at different rates of speed. Some people take longer to learn a new task or event, while others can easily go from one event to another without any problem. Give opportunities for adequate time on-task to everybody. In terms of teaching, this means having adequate amounts of time available for practice in various events rather than use of the shotgun approach. When working with individuals with mental retardation *more time may be needed* to learn new tasks, while those with learning disabilities may not need extra time but *highly structured time* so their attention does not wander.

The law of readiness (neurological and neuromuscular) implies that teachers understand the principles of human development and will not subject an individual to an experience which is age-inappropriate or controversial. An excellent example is weight training for young children. There is controversy as to whether children prior to puberty should engage in vigorous weight training routines due to possible damage to growth cells in bone or tearing of muscles and tendons. Many field events in track involve weight training for upper torso development (discus, shot put, and javelin). Running events involve all around conditioning but particularly in the legs. Children with muscular/skeletal disabilities such as muscular dystrophy, arthritis, or cerebral palsy can partake in *some* weight resistance activity but not to an extreme (depending on the individual and degree of involvement).

The law of effect suggests students will repeat activities they like and in which they are successful. Organize and present track and field activities in a fun and nonthreatening manner for all participants. If any students are afraid of some equipment, let them touch it first, walk around the track before running for speed, and use lightweight equipment to ensure success while learning new skills. If someone is afraid of the high jump bar (very common) start them with ropes wiggling on the ground and then progress to a very low bar, or let a student jump around in the landing pit to get the feel of what it is like to land after a jump. The most important concept here is to make the learning experience as positive as possible so that the student will want to come back and try it again (Sherrill, 1986; Rich, 1990).

Successful instruction for track and field events relies on understanding the nature of disabilities in relation to motor output problems. A scientific orientation of the disability in relation to a specific event is needed. A good example is a person with spastic cerebral palsy. Spasticity is caused by a lesion in the motor cortex of the brain. This may result in different degrees of spasticity and in different limbs being affected. If a person's dominant throwing arm is affected and not legs, then that individual might find more success with running events than throwing events. If a person is in a wheelchair and has spasticity in all four limbs, running backwards (in a wheelchair) may be an alternative way to run the track. Throwing a discus (while in a wheelchair) with one's back to the throwing area may be the choice for throwing events. There are many adapted physical education texts available which can serve as resources for gaining a basic understanding of the nature of the disability and kinds of motor output problems which are found. A caution should be noted here. It is not appropriate to generalize this information in a blanket manner because individuals do have different capacities for success. Do not hesitate to present an opportunity to try an event if a student wants to. Sometimes a student may develop a unique style for participating in the event which neither the instructor nor the textbooks have figured out!

Nature of the Sport or Activity

Track and field offers students a variety of different activities. Running events can be short distances (50, 100, 200, 400, 800 meters), middle distances (1,500 meters), and long distances (3,000, 5,000, and 10,000 meters) and with or without hurdles. For ambulatory grade school children a 25 yard dash is appropriate as is a 25 yard cone slalom for young children in wheelchairs. Indoor running tracks of various distances can be developed in the gymnasium or on blacktop.

Field events such as discus, shot put, high jump, and running long jump are dependent upon equipment available. A plus to field activities is they can also be practiced indoors with rubberized equipment and thus afford an opportunity for continuous learning despite weather factors. Weight of many of the throwing implements can also be modified as needed. In addition to junior weights and sizes of equipment, it is also appropriate for very small children to use plastic or foam equipment.

Teachers are responsible for understanding specific techniques for events taught. This means an understanding of biomechanical and physiological principles is a must. For example, in teaching technique for the 100 meter dash it is important for teachers to know the most efficient form for this sprint event and then be able to modify it as needed for individuals. Understanding body lean, start techniques, knee lift, and arm motion is critical if teachers and students are to have success. Being prepared to instruct in each event requires preparation. There are many resources available in track and field from scientific textbooks to magazines and professional journals. If there is a nearby university with a physical education or recreation program, it's a good bet there are library holdings available. Other resources include sports organizations for individuals with disabilities, such as Special Olympics, which publish their own teaching/coaching materials.

Running Events

In track and field some event techniques can be generalized. Running events, although differing in distance, have some commonalities which must be covered when teaching:

> **Starting techniques**--traditional four point start, line stand-up starts for sprints, and staggered starts for longer distances. The traditional four point start from blocks in events of 800 meters or less may be appropriate for some and not for others. An individual with missing upper limbs, for example, would be able to use the stand-up start and be just as effective, while students with auditory problems need to see the starter. The staggered stand-up start allows persons with visual impairments to use a partner when running in a synchronous manner.
>
> **Staying in one's lane** is a concept difficult for some individuals to grasp. They run across several lanes and may get in the way of other runners, causing harm to themselves or others. One way of adapting is to have cones separating one lane from another and work toward eliminating these artificial barriers. Running with a partner is another method to help keep a runner in the proper lane. Another aspect of running in lanes is using the inside part of the lane when

rounding curves to decrease amount of space traveled and thus run more efficiently.

Crossovers (for middle and longer distances). Once an individual understands how to run in the lane there is need to teach this person when to cross over into the inside lane for longer distance runs. This concept is important because in the longer runs, running on the outside lane is a distinct disadvantage; because of the extra distance covered and effort expended, one is tired more quickly. One way to adapt is to run with a partner or use a "rabbit," a person who leads the run. Another adaptation is to mark changeover lanes with cones to direct a person into the inner lane. Runners must be taught to look out for other runners and not cut them off.

Body leans, arms swings, and leg kicks for the sprints. Sprinters must be taught to lean slightly forward, have even arm swings (and straight!), and push off on every stride so the back leg is almost straight. Have students practice skipping with exaggerated motions, swinging arms and lifting knees so they are "high stepping" across the infield. Practice driving off the back leg for three-four steps with a forward body lean and gradually lengthen the number of steps until there is a fluid and continuous motion. Some students use music to practice getting a rhythmic running form.

Tactics for running. Teaching strategy for running is important for winning races (or being the leader), as well as for avoiding accidents. Strategy for running sprints includes not looking back over the shoulder at an opponent, leaning into turns on the 200 meter and over distances, pacing oneself on middle and longer distances, and running through the finish line for all events. Individuals with mental retardation may have trouble in any or all of these aspects. It is necessary to train in each strategy every day over an extended period of time. The use of cue words or phrases at certain points in the run is also effective. Pacing may be taught with the use of a "rabbit," a person who leads the pack of runners so no one can pass the leader. This person can slow down and speed up so runners can learn to adjust their pace. Partner runs can help with pacing for all individuals.

Sprinters should be taught to fixate ahead in the lane in which they run and to ignore any outside distraction from neighboring lanes. This is often difficult for those with mental impairment. An approach to take with these individuals would be to have them run with cones on either side and fixate on a coach at the end of the track. Have them practice alone at first, then run with a person on their right. Finally, add a person to the lane on their left.

Leaning into turns on the longer distance runs is an important technique. It makes the runner more efficient. In leaning it is important not to overlean or underlean as either can cause a runner to lose balance and cause an accident. This technique takes time to develop and lots of practice.

Perfect practice makes for perfect performance. Thus, extended time on-task may be needed for individuals with mental retardation to overlearn these skills. Those with learning disabilities may need to have a variety of shorter tasks to practice if there is an attention span problem. Persons with visual impairment may need to have someone manually manipulating them through the range of motion or to feel how another runner performs. Individuals with upper limb amputations will need to work on maintaining an upright upper torso as well as balance, depending whether one or both arms are missing.

Field Events

Field events pose an altogether different kind of problem as they involve different implements (discus, shot put, javelin) or even the body (high jump, running long jump). Yet these events also have some commonalities which the teacher must understand:

Release point for projectiles. What is the most effective angle for release? An understanding of technique is essential for the teacher. Another asset is the ability to observe total performance as well as isolate on different components of movement. For optimum distance on throws, the 45 degree angle is the most often used reference point for release of objects. A successful way to teach this concept is to have students touch their ears with the side of their arm. Explain it is necessary for their arm to finish the skill by touching their ear at this angle. Another way to teach this concept is to manually manipulate students' arms through the range of motion several times. Still another way is to let students hold onto another person's arm while that person goes through the range of motion. Starting with lightweight objects such as foam and rubber implements is also a tactic for practicing correct release for throws.

Take-off points for jumping events. For high jump, running long jump, and javelin count how many steps, measure the width of steps, and practice the approach speed. To assist students with counting problems mark starting points with tape or ribbon. To determine width of steps have them start slowly with three-four exaggerated steps and then speed up to smaller steps. A different colored marker can be used to indicate when the student should change from larger start-up steps to the narrower, running speed steps. Counting out loud is another approach to use. Using visual markers and/or verbal commands is helpful to those with mental retardation, learning disabilities, auditory impairment, visual impairment, and amputations. Using footprints for placement of feet may also be useful for those individuals with mental retardation and learning disabilities so they start off on the correct foot each time.

Spinning technique for shotput and discus. Being able to rotate one's body to give momentum prior to release of discus or shot is critical to increasing performance. Students need to first practice how to pivot. This can be taught by a follow-the-leader approach, use of colored footprints, or demonstration by another student. Eye fixation also needs to be practiced in order to prevent dizziness and disorientation. Most individuals will need to first practice pivot and spin separately, then combined. This practice should be without an implement in the hands. After these skills are mastered the concept of follow-through should be presented and practiced without implement first and then with implement. In this case form is important to the success of the event and repetition is necessary for satisfactory and successful performance.

Weight Training. Deciding how much, how often, and what body parts to condition is important. Developing muscle strength is a necessity in most sports and track and field is no exception. Persons with well-developed upper torso strength usually do better in field events and the lean body type individual does better in running and jumping events. For all track and field events, weight training is appropriate. For field events, development of bulk in the upper torso is sought, while for runners leg strength is developed. Individuals with disabilities can and should engage in weight training activities. This is an excellent example of an activity which can be "adapted" to an individual's strengths. Students can lift different poundage and types of weights without being discriminated against. A person with cerebral palsy, even if they are spastic, can lift weights and show some improvement in performance. A person with mental retardation also can accomplish this task with highly positive results. Motivators can take the form of charts, rewards, and tokens.

Weight training should be held to an every other day routine. Weight training to increase bulk does tear down muscle. One day of rest between workouts is routinely observed by athletes in training.

Flexibility must also be attended to both before and after weight training to ensure maximum performance capability for all students. Flexibility exercises should be completed prior to all activity by students. Those individuals in running events should work more on legs and arms while those in field events need to work on twisting and shoulders as well as legs.

Capabilities and Experiences of Individuals

There are several factors to consider when deciding whether or not to integrate individuals with disabilities into regular track and field. One aspect is prior experiences of the individual with a disability. What skills do they already have? What do they need to learn? What is their "best" activity? Other factors to be considered include if they can follow directions, work with another person, in small groups, or independently, and if their social behavior is appropriate.

Prior experiences of able-bodied students with individuals with disabilities must also be considered. It is important to learn if they have had any prior contact with anyone with disabilities and, if not, to sensitize them so they are prepared to interact positively. Successful integration does not "just happen"; it must be planned.

Strategies for Adaptation

Gavron (1989) identified several teaching strategies which can be applied to accommodate individuals with disabilities in a physical activity setting. These are meant to be applied across activities and should at least be considered within track and field.

> **Use of peer tutors.** Utilizing students in higher grades as peer tutors is a tried and true method. Having athletes come in on a regular basis to assist in classes is also a viable approach. Track and field lends itself to buddy systems and small group approaches. By having students with and without disabilities together in small groups there is opportunity for those developing new skills to be assisted or motivated by those with developed skills. Having track athletes work with individuals with disabilities gives them stature and provides that sometimes needed one-on-one help.

Adapt rules. It may become necessary to adapt some track and field rules, but for the most part the activity itself can be altered instead. For example, in grade school having a 25 yard dash instead of a 50 or 100 yard dash is very appropriate. In junior high and high schools distances may vary to accommodate students' abilities. Running events may be conducted with a partner.

Adapt equipment. Junior weight field implements are available as are foam and rubberized materials. Sometimes a change in size, shape, or color of equipment will assist a student in performance of a task.

Modify technique. As previously discussed, the process for efficient performance may have to be modified for someone in order for them to experience success. Allow for unique movement patterns if they result in success.

Vary instructional approaches. Understand that students learn at varying rates and in various ways. Some children are verbal (listeners) learners while others are visual and still others are concrete learners (hands on). Some children have to "see it, hear it, and then do it" in order for a technique to sink in. Some other instructional approaches include the following:

--Increase repetition so practice is of high quality.

--Simplify directions.

--Use poster boards and stations to organize practices.

--Give immediate and specific feedback in a ratio of 4:1 positive to negative.

Feedback is what the teacher gives to the student following student performance. It can be verbal or nonverbal, positive or negative. Examples of specific verbal feedback are: "Nice job, Joe, I like how you ran through the finish line"; "Jane, you did an excellent job in releasing the shot at just the right angle because your arm was by your ear." Nonverbal feedback can take the form of a thumbs-up sign, a smile, or a wink. It is important to give positive feedback within three-five seconds. This is especially true when working with individuals with mental retardation. It is also important to give time for someone to respond to a task command, about three to seven seconds. We sometimes have the tendency to bombard individuals with lots of cue words and this does not give them a chance to process the original command (Dunn, Morehouse, & Fredericks, 1980; Pfeufer, 1982).

Strategies for Specific Disabilities

Rather than examine each event for adaptations, disabling conditions and different strategies are presented in the following sections. This approach emphasizes adaptations based upon motor output needs which may be applicable in one or more events. Specific rules adaptations are available via sports organizations for individuals with disabilities and should be consulted if a student plans to compete. As with any sport participation, it is important students have a physical prior to involvement.

Mental Retardation Developmental Disabilities

Check individuals with Down syndrome for atlanto-axial dislocation prior to participation in any sport program. If present, any activity which puts pressure on the neck region, such as high jumping, is contraindicated.

Repetition of task is necessary.

Allow appropriate time for individual to process a response.

Demonstrate throwing or running form. Follow with manual manipulation through the range of motion.

Break specific events down into "chunks" or steps which are sequential and have attainable goals.

Utilize peer tutoring.

Establish a buddy system for distance running.

Apply behavior management strategies as needed for specific individuals.

Be sensitive to the effect of sun and heat on individuals with Down syndrome.

Hearing Impairments

Diagram boundaries and location of all events (particularly, highlight areas or airborne projections).

Utilize pictures, posters, and video tapes to assist in technique refinement.

To facilitate lip reading, directly face individuals when talking.

Utilize message boards (in strategically located areas) in longer distance events.

Visual Impairments

Walk the track or long running course prior to practicing.

Use voice, wooden clappers, or automatic beepers to assist in direction orientation.

Count steps in approaches for high jump or running long jump.

Use a tether system for running events of 400 meters and longer. Make sure the tether (elastic, canvas, or rope, etc.) is not too long between people so as to result in tangling up arms while running. It helps to practice running with a sighted person to make sure both athletes are running smoothly together.

Use guide wires or lines along the track.

Physical Impairments

These suggestions refer to individuals who are ambulatory and can include those with cerebral palsy, amputations, muscular dystrophy, arthritis, and other orthopedically related conditions.

Assist individuals into and out of activity positions as needed (Portia, 1990, p. 241).

For amputees and crutch walkers, utilize activities which involve the upper torso.

Encourage those with amputations to try anything with or without their prostheses.

Allow crutch walkers, cane users, and those with braces to ambulate as fast as they can down the track. They should not be kept from going "as fast as they can" if they have good control over their body. They might fall, but so may any able-bodied runner. Teach falling! Teach them that maintaining a rhythmic gait when running is very important to their success. The use of the arms for balance should be emphasized.

Adapt starting positions as necessary utilizing a four point crouch start or stand-up start. Persons in wheelchairs who have to run backwards or throw from a backwards position should be allowed to do so. Starting positions can be adapted for individuals as needed so they can see or hear the gun better and still maintain balance.

Other Health Impairments

This group represents a broad area of conditions. Persons with asthma, diabetes, allergies, sickle cell anemia, or epilepsy are just some of the people with health impairment conditions. Many of these individuals, particularly as they enter junior and senior high school, are very familiar with their condition and associated medical needs. However, there are certain kinds of information which a teacher must have available--

Nature of medications, when taken and dosage. Medicines and the outdoors may not mix. For example, certain kinds of antibiotics can cause a person to become sensitive to the sun. In track and field a person is outdoors for many hours and may therefore need to wear a hat or find a shady spot. Another example is the diabetic. If a person is an insulin dependent diabetic the amount of insulin may need to be varied according to energy output. Individuals with diabetes are also affected by extremes in heat and humidity and must eat a balanced diet at about the same time each day. Some medications need to be taken with food while others are taken prior to or after eating. A teacher must be aware of medications used, schedule for administration, and drug interaction effects.

Eating habits of students (they should not skip meals). A balanced diet is essential for optimum performance. In track and field an improper diet can affect energy levels, endurance, and muscle strength. Thus, eating regularly and appropriate amounts of food are important. Be sure your students eat breakfast, lunch, and dinner. Diets to lose weight should not be undertaken during the competitive season. Diets can be permitted prior to the beginning of the season and only under strict supervision.

Heat and humidity affect performance. Extreme heat and humidity can cause problems as well as can cold, damp weather. Because track and field is subject to the elements appropriate clothing must be worn. Layered clothing works best for both warm and cold environments. Hypothermia may be a problem to students who are spinal cord injured or to amputees. For example, on a cold (e.g., 40 degree) windy day, wind chill becomes a factor when a person is exposed for long periods of time. Heat exhaustion and heat stroke are liable to affect anyone who does not hydrate (drink liquids) appropriately on hot and humid days. Water intake should be constantly encouraged on these days to prevent leg cramps and fainting. Asthmatics are very susceptible to increased attacks in cold, damp weather and also may have a problem in summer with pollen, ragweed, and other allergies. Having the proper inhalant available is a necessity. Some individuals are even sensitive to air pollution and will have vision problems. Individuals with cystic fibrosis will have problems with running in a polluted environment as would individuals with chronic asthma.

Necessary emergency procedures. A teacher should have, at the least, a basic first aid knowledge. In track and field, due to the nature of its space requirements, facilities are usually located at some distance from the mainstream of activity. A teacher should have a first aid kit available at the track at all times. Liquids should also be available as well as an ice bucket. It is not unreasonable to expect a teacher to take these things out with the first class of the day and have them available all day long. Another safety aspect is to have phone numbers of emergency services with you at all times. Some people may need assistance if they get stung by a bee, have an epileptic seizure, run into objects, are hit by projectiles, or run into another person. It does help to have a safety plan for any and all activities. Teachers must be able to recognize signs and symptoms of insulin shock, diabetic coma, heat exhaustion, heat stroke, suspected broken limbs, and hypothermia.

It is also important for a teacher to know who has allergies, who is dependent upon insulin, who is wearing contact lenses, and who has epilepsy. Close communication with the school nurse is essential. The teacher should always make contact with the school nurse at the beginning of the year to ascertain any changes in health status of students.

In terms of instruction in track and field events there is usually little or no modification needed except what is medically advised. For example, instructional time may be decreased if weather is a factor (too hot or too cold) for individuals with asthma, epilepsy, and possibly diabetes. In the case of health impairments it is important for individuals to assume responsibility for their own well-being with little interference from authority figures, except as needed.

Conclusion

Barriers to participation in sport, games, and recreation by individuals with disabilities are decreasing. More than ever teachers of physical education, recreation, and youth sports must endeavor to avail themselves of information on specific track and field techniques. Read professional journals, join professional organizations, and attend conferences on a yearly basis. Being an informed professional is half the battle in allowing persons with disabilities to gain access to sports such as track and field.

Track and field allows for individual excellence within a team concept. Track and field allows for unique movement patterns which can result in success for everybody within acceptable parameters. Track and field is a medium to increase physical fitness in several areas (flexibility, strength, cardiovascular endurance). Track and field is perhaps the sport most adaptable for individual differences and indeed a sport for **ALL** persons.

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Sherrill, C. (1986). Adapted physical education and recreation: A multidisciplinary approach (3rd ed.). Dubuque, IA: Wm. C. Brown.

RESOURCES

Ability. A magazine about amputees in a variety of activities.

Adapted Physical Activity Quarterly. Research articles about individuals with disabilities. Covers a wide range of topics including sport performance, physiological considerations, and biomechanics of sport performance in selected areas.

Jones, J.A. (Ed.). (1984). Training guide to cerebral palsy sports (2nd ed.). New York: National Association of Sports for Cerebral Palsy. A comprehensive book on training and conditioning of individuals with cerebral palsy.

Palestra. A magazine about sport and recreation for individuals with disabilities. Features training profiles about athletes with disabilities, research articles, and technique articles in a variety of sport areas.

Sports and Spokes. A magazine about individuals who utilize wheelchairs. Articles cover a variety of sport and recreation activities.

Track and Field Quarterly. A major source of articles and technique information on all aspects of track and field.

Sport organizations that have rule books and other specific resource materials available include the following:

National Wheelchair Athletic Association
United States Association for Blind Athletes
American Athletic Association for the Deaf
Special Olympics
United States Cerebral Palsy Athletic Association
United States Amputee Athletic Association

PRACTICAL POINTERS

WEIGHT TRAINING FOR WHEELCHAIR SPORTS

All other factors being equal, a strong athlete will surpass performances of an athlete with less muscular strength and endurance. This is as true for athletes who compete in wheelchairs as for their able-bodied counterparts. Until recently, few athletes competing in wheelchair sports at any level--international, national, regional, state, or local--except for those in competitive weight lifting, gave any consideration to overall improvement in muscular strength and endurance as important and integral parts of complete training programs. Even today, too few athletes competing in wheelchair sports incorporate some type of weight or resistance work into their overall training programs.

This PRACTICAL POINTER provides information about basic weight or resistance training programs, including basic lifts and supplementary exercises. They have proved practical and functional for athletes of all wheelchair competition classifications. It will be helpful for those using this information to review the definitions which appear in a box toward the end of this article.

It is interesting to note that George Murray, winner of the 1978 Boston National Wheelchair Marathon in world record time of 2:26:05, trained with weights three days a week for the year preceding his record accomplishment; he also worked out on the track three days a week. In terms of days per week, time was equally divided between muscular strength and endurance and track work. Prior to initiating this coordinated program, George Murray could not complete three miles nonstop!

Special thanks and appreciation are extended to Jane S. Bradtke, AAHPER/IRUC information and materials assistant, whose creative art work has added so much to this PRACTICAL POINTER.

Debunking the Myths

Misconceptions abound about relationships of muscular strength and endurance and ability to perform specific skills. Because of these misconceptions, many athletes do not receive full benefits from time and effort devoted to training. In fact, approaches and methods followed by some athletes actually interfere with their overall progress and personal development. For example--

- Use of a heavy shot, discus, or javelin in practice does little to develop and improve muscular strength and endurance for these field events. In fact this procedure can do a great deal of harm by disrupting flow, continuity, and quickness of movements so important to success in these field events. Any approach that disrupts smooth and efficient execution of specific skill movements should be avoided for all sport events and activities. Muscular strength and endurance should be increased through an appropriately developed and adequately supervised weight or resistance training program.

- Weight lifting and weight or resistance training are not synonomous. Weight lifting is a sport in and of itself; the objective in weight lifting is to lift the heaviest weight possible. Training for weight lifting necessitates lifting heavy weights in practice in the same ways required in competition. On the other hand weight or resistance training is designed to help an individual develop and improve general muscular strength and endurance. Through training in specific sport skills an individual develops the ability to apply increased general muscular strength and endurance in events in which he/she participates. Modifying ways in which certain weight or resistance training exercises are executed provide additional assistance for developing skills for certain track and field, swimming, or other sport events; i.e., do bench presses on a forty-five degree slant board so that the angle and range of motion are the same as in putting the shot.

- Muscular strength and muscular endurance are not synonomous. Muscular strength refers to the amount of work a muscle or muscle group can do in a single all out contraction or effort. Translated to weight programs, muscular strength means the maximum amount of weight that can be lifted one time. Muscular endurance on the other hand refers to the amount of work a muscle or muscle group can do repeatedly against less than maximum resistance or weight. Translated to weight programs, muscular endurance is related to the number of repetitions that can be performed with less than the maximum amount of weight that can be lifted only one time. Obviously, the lighter the weight, the greater the number of repetitions required to attain the same degree or amount of work or muscular endurance.

- Weight for resistance training does not make an individual muscle bound, restrict range of motion, or limit flexibility. The type of weight program--i.e., strength or endurance emphasis--affects and contributes to the degree of muscular definition resulting from these programs along with a number of other factors including basic body type, musculature itself, and certain hereditary factors. A properly designed and appropriately carried out weight or resistance training program actually improves and enhances both range of motion and flexibility. Full range of motion and flexibility in turn aid and further skills and movements for events or sports in which individuals participate.

- Taking part in a weight or resistance training program in no way detracts from the femininity of females who use this training method and approach regularly. Today more than ever before female athletes are using weight or resistance training to enhance their performances on the athletic field. In addition, many beauty queens, television and movie starlets, dancers, and girls next door participate in weight or resistance training with positive results on their figures and femininity.

- While frequency and timing of weight or resistance training programs need to be modified or altered during a given competitive sport season, they should not be eliminated or stopped altogether during these seasons. Athletes who stop weight or resistance training once a competitive season starts find themselves stronger at the beginning of the season than at the end of the season. The end of a season is when athletes want to put it all together in terms of maximum muscular strength and endurance, optimum cardiorespiratory efficiency and effectiveness, greatest skill levels, and highest degree of motivation. These factors result in championship performances and fulfillment of personal goals and season objectives.

Guidelines For A Sound and Safe Program

A few basic and easily applied principles and practices provide the foundation for a sound and safe weight or resistance training program. Muscular strength and endurance are improved through application of the overload principle. For a muscle to increase in either strength or endurance it must be overloaded through use of external resistance or weight. Overload results in an increase in the cross-sectional diameter of involved muscle fibers. A larger muscle fiber, just as a bigger rope or guy wire, is stronger and capable of doing more work for longer periods of time. The legendary Milo was able to lift a full grown bull over head because he had lifted the bull daily from the time it was a calf. As the calf grew so did Milo's muscles and muscular strength.

For best results in applying the overload principle in weight or resistance training adhere to the following guidelines -

- Keep repetitions for each exercise or lift between eight and twelve. If a given weight cannot be lifted eight times, it is too heavy; more than twelve times indicates that the weight is too light for maximum benefits. One set of properly executed exercises is all that is needed for each specific lift.

- Be sure every lift goes from a prestretch--i.e., slightly extended--position if at all possible through the full and maximum range for involved body parts.

- Make each lift in a slow, smooth, continuous, and controlled manner. Too rapid movements result in weight being jerked or thrown; this is not only ineffective and inefficient for building muscular strength and endurance but makes the individual susceptible to injury, possibly a serious one.

- Take two to three seconds for the active or positive portion of each lift and four to five seconds for the return or negative portion of each lift. It is extremely important to execute the return portion of a lift slowly. Some weight training authorities feel that the slow and controlled return of weight is the most important portion of each lift.

- Control breathing by either inhaling and exhaling as normally as possible, or by inhaling during the active or exertion portion of the lift and exhaling during the return portion of the lift.

- Be sure that the exact movement pattern for each lift is fully understood and can be executed exactly before determining initial training resistance or weight for each lift. Accomplish this by using light weights and a limited number of repetitions under the watchful eye and supervision of someone who can make corrections as needed.

- Establish initial training resistance or weight by doing as many lifts as possible for each exercise. If this number is less than eight, the weight is too heavy; more than twelve, the weight is too light. Record weight and repetitions so that adjustments up or down can be made at the next workout session. Follow this procedure until each exercise or lift is done between the specified eight and twelve repetitions. Err if you must in the direction of starting with weights that are too light rather than too heavy; make haste slowly rather than too fast in establishing initial training resistance or weight.

- Be sure lifts are done in the same sequence from workout to workout or training session to training session. In this way the fatigue factor is always relatively the same at various points throughout a workout or training session since lifts are done in the same order. When establishing a workout sequence, place lifts in an order that does not require use of the same muscles or muscle groups in consecutive lifts.

- Allow enough time between workouts for adequate recovery or muscle tissue will be torn down rather than built-up. Plan regular or between season workouts three times a week--Monday/Wednesday/Friday, or Tuesday/Thursday/Saturday routines. Never lift two days in a row; forty-eight to seventy-two hours (two to three days) should be maintained between weight training workout sessions and never more than ninety-six hours (four days). During the competitive season lift two days per week, ideally the day after a big meet or game and again seventy-two to ninety-six hours (three to four days) later.

- Adjust the daily timetable during the period when determining initial training resistance or weight. During this period of time it is both permissible and advisible to work out daily. This not only reduces the total amount of time required to determine initial starting resistance or weight but reduces possibilities of muscular soreness from these new movements and patterns.

- Place hands about a shoulder width apart on the bar unless a different spacing is indicated for a specific exercise or lift. Hand spacing of more than a shoulder width restricts range of motion for a given lift so that its benefits are limited and greatly reduced. Within this weight or resistance training program, hands are moved closer together when they are changed from the basic shoulder width spacing.

- Do as many repetitions of each exercise or lift as humanly possible. Never feel that one or two more lifts could have been accomplished with additional effort. Use weight or resistance activities as another means of developing and furthering personal discipline and mental toughness which are so important to success in sports.

- Increase weight five to ten percent when twelve repetitions have been attained for a given exercise or lift. Expect more rapid progress, increase in weight, and shorter time in reaching twelve repetitions in early stages when using lighter weights than in later stages when weights get heavier.

- Record weight and number of successful repetitions for each exercise and lift during every workout or training session. Only with accurate and exact records can weight or resistance training programs be kept scientific, individualized, and personalized.

- Use spotters (assistants, coaches, other athletes) or weight racks for exercises or lifts in which they are needed or when weight gets heavy when using barbells. The nature of multistation machines or special devices for specific lifts is such that various exercises and lifts can be accomplished safely without spotters or weight racks.

- Make necessary adaptations in using different pieces of equipment and resistance devices according to your own particular condition and situation. For example, curls and reverse curls done in a wheelchair can be more effective with two single handle pulleys, swing bells, or hand dumbbells than with a long barbell. For some individuals certain lifts can be performed more vigorously and safely when the athlete is strapped into his/her wheelchair.

- Use multistation pieces of equipment, special devices designed for particular movements and specific muscle groups, barbells, and swingbells in place of conventional barbells. Young children and youth can benefit from resistance or weight training activities by using logs, window sash weights, folding chairs, or car axles; homemade barbells constructed with wooden dowels or broom sticks, and different sized tin can filled with various amounts of cement; bleach bottles filled with sand or dirt; stuffed animals filled with buckshot, BBs, or sand; and wooden dowels or broom sticks with objects such as door knobs, pieces of metal, or fishing sinkers attached.

- Be sure weight or resistance training programs and workout sessions are balanced so that both agonist and antagonist muscles--flexors and extensors--are included. Since natural imbalance exists between muscles and muscle groups that work together--as one muscle or muscle group contracts, antagonistic mucles or muscle groups relax--consideration must be given to both sets of muscles in weight or resistance training programs. Both flexors and extensors--i.e., biceps and triceps, quadriceps and hamstrings--must be programmed so imbalance is not further accentuated which can lead to injuries and reduced performances.

- Recognize a sticking point when one occurs. A sticking point is reached when twelve repetitions for a given weight in a specific lift cannot be accomplished after several sessions. If a sticking point occurs, add five, ten, or more pounds to the bar and do fewer repetitions for several days before returning to the weight and repetitions being attempted before modifying the system to break the sticking point. Increasing the number of sets for a given exercise or lift can also be helpful in breaking a sticking point. When increasing the numbers of sets, build up to two or three sets with twelve repetitions in each set before returning to weight and repetitions at which the sticking point occurred. Remember, when using multiple sets, the key is reaching twelve repetitions in the second and third sets,not exceeding this number on the first set when relatively fresh and not fatigued. This also requires personal discipline and mental toughness. Do not rationalize failure to attain twelve repetitions of a given weight for a specific lift as a sticking point. Be sure that such a plateau is a genuine sticking point and not a reflection of less than the all out effort needed in every workout session if it is to provide maximum benefits. These modificiations should be considered and used only as procedures for breaking sticking points for given exercises or lifts. As previously stated, one properly executed set under most conditions is all that is required in this weight or resistance training program to attain desired increases in muscular strength and endurance.

- Consider other variations on occasion to add interest and fun to workouts and training sessions as well as for breaking sticking points: (1) time how long it takes to do a specific number of repetitions of an exercise or lift, or (2) see how many repetitions can be done in a given length of time being sure that this time is not too long. Be sure that basic principles and practices outlined in these guidelines are not compromised when variations of this type are introduced and used.

Weight or Resistance Training Lifts

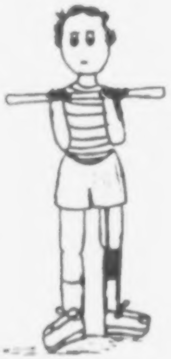
The following weight or resistance training lifts are designed primarily for adding muscular strength and endurance to the arms, shoulders, upper back, and chest. These lifts are described as they would be done with barbells. Descriptions for each lift include its name, starting position, movements, and special notes about the lift and its execution.

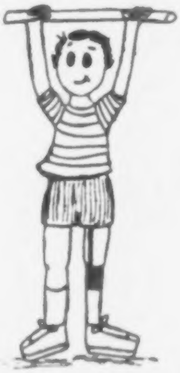
In several instances lifts are done from standing positions. Possible modifications and adaptations are suggested in discussions about some of these lifts and in accompanying illustrations. Obviously, many other applications of these basic lifts can be developed and used according to type of impairment, level of spinal cord leision, medical classification, functional ability, and individuality of each athlete. Basic principles and practices have been presented so that an individualized and personalized weight or resistance training program can be developed in terms of each athlete's specific interests and his/her unique and special needs.

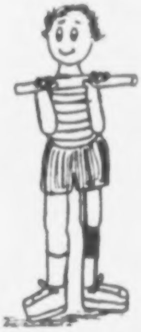
Regular or Standing Press

Both Regular or Standing Press and Military Press do not have to be included in the same training program or workout pattern.

Starting Position	Movement
. Stand with feet about a shoulder width apart.	. Lift weight over head in one continuous movement.
. Hold bar with palms of hands facing away from the body.	. Extend arms fully until elbows are straight.
. Start weight from chest level with elbows close to the body and perpendicular to the floor.	. Lower weight to chest level.



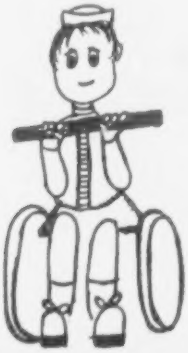


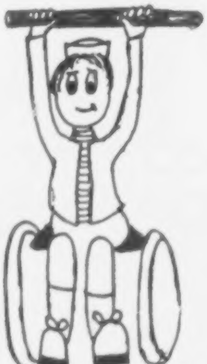


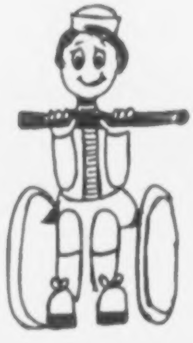
Military Press

Both Military Press and Regular or Standing Press do not have to be included in the same training program or workout pattern.

Starting Position	Movement
. Sit on a chair, bench, or on the floor.	. Lift weight overhead in one continuous movement.
. Hold bar with palms of hands facing away from the body.	. Extend arms fully until elbows are straight.
. Start weight from chest level with elbows close to the body and perpendicular to the floor.	. Lower weight to chest level.





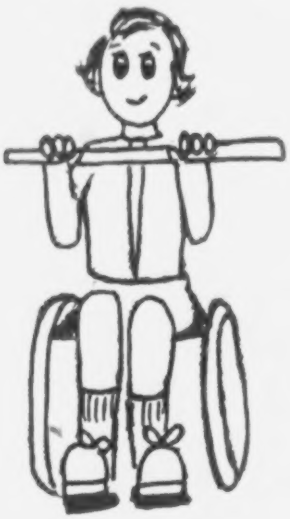


Behind the Neck Press

This lift may be done in either a standing or seated position.

Starting Position

- Hold bar with palms of hands facing away from the body.
- Start weight from chest level with elbows close to the body and perpendicular to the floor.

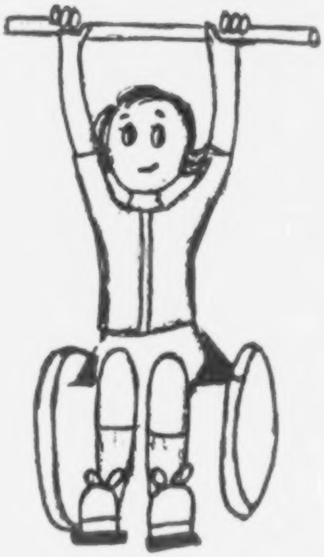


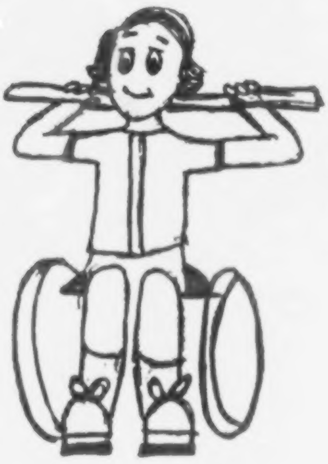
Movement

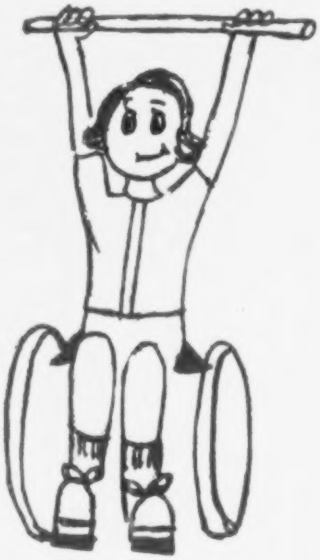
- Lift weight over head in one continuous movement.
- Extend arms fully until elbows are straight.
- Lower weight to a position behind the neck.
- Lift and lower weight from behind the neck being sure arms are fully extended and elbows straight on each upward movement.
- Return weight to starting position at chest level when set is completed.

Alternate Movements

- Lift and lower the weight alternately from chest level to over head position, to behind the neck, to over head, to chest level, to over head, to behind the neck to over head, to chest level until the set is completed.



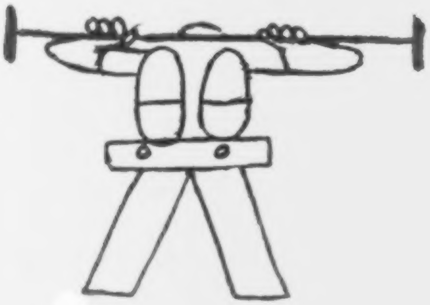




Bench Press

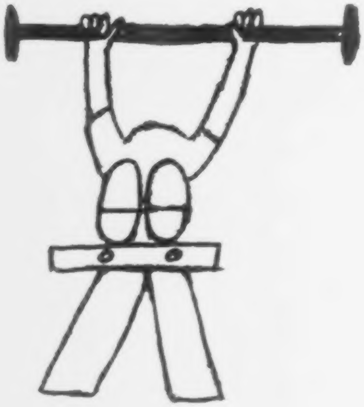
Starting Position

- Lie on the floor or on a bench.
- Hold Bar with palms of hands facing away from the body.
- Start weight from the chest with elbows perpendicular to and directly under the bar.



Movements

- Lift weight straight up from the chest in one continuous movement.
- Extend arms fully until elbows are straight.
- Lower weight back to the chest.

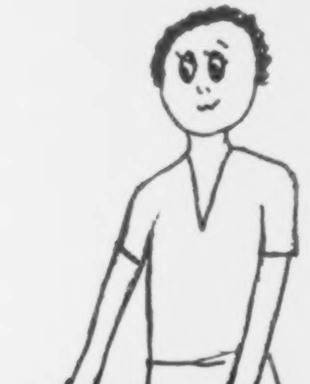


Curl

This lift may be done in either a standing or seated position.

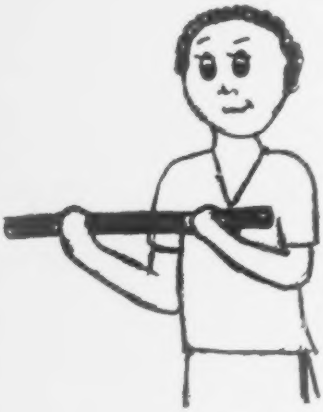
Starting Position

- Start weight at thigh level with palms of hands facing away from the body and elbows straight.



Movements

- Bend elbows and lift weight to shoulder level without bending or rocking the body.
- Lower weight to starting position at thigh level.



Reverse Curl

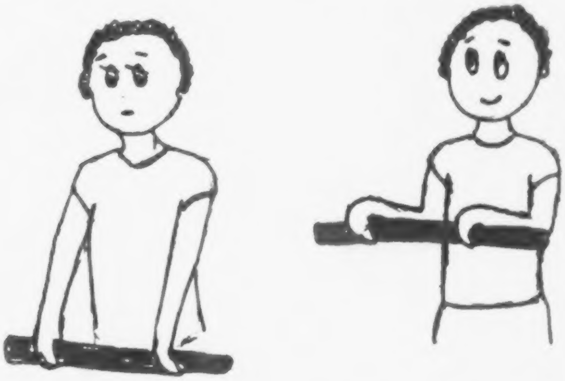
This lift may be done in either a standing or seated position.

Starting Position

- Start weight at thigh level with palms of hands facing toward the body and elbows straight.

Movements

- Bend elbows and lift weight to shoulder level without bending or rocking the body.
- Lower weight to the starting position at thigh level.



Upright Rowing

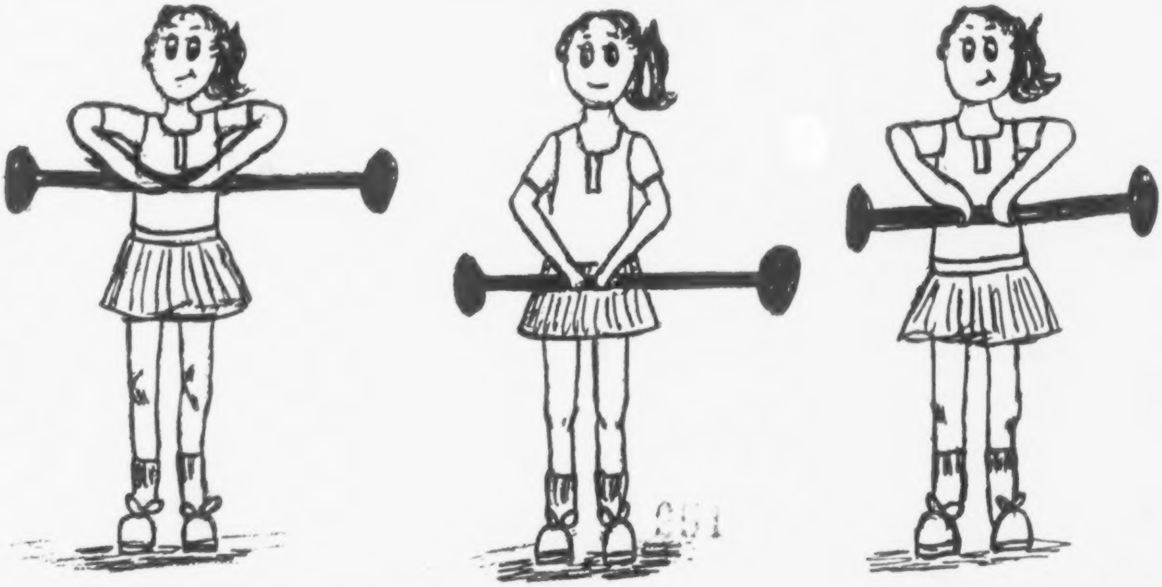
This lift may be done in either a standing or seated position.

Starting Position

- Hold weight at shoulder level with palms of hands facing the body and hands as close together as possible.
- Keep elbows higher than the bar at all times during movements of this lift.

Movements

- Lower weight until elbows and arms are straight.
- Lift weight to starting position at shoulder level being sure to keep elbows higher than the bar throughout all movements of the lift.



Rowing

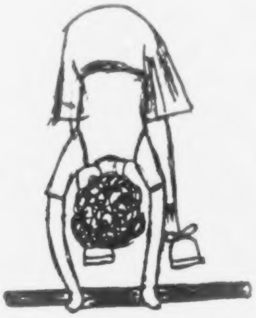
Although this is described from a standing position, it can be done from a wheelchair and modified accordingly.

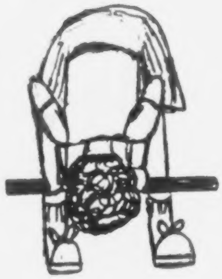
Starting Position

- Place feet slightly more than shoulder width apart.
- Bend forward from the waist until the upper body is parallel to the floor.
- Hold bar with palms of hands facing toward the body.
- Hold weight off the floor at ankle level.

Movements

- Lift weight until it touches the chest.
- Lower weight to starting position at ankle level.





Pull Over

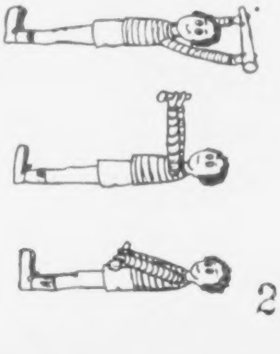
This exercise may also be done as two separate and distinct lifts: (1) move alternately from specified starting position until the weight is directly over the chest and back to the starting position, or (2) move alternatively from the position in which the weight is directly over the chest until it rests on the thighs and back until it is over the chest.

Starting Position

- Lie on the floor or on a bench with arms extended overhead.
- Hold bar with palms of hands facing the ceiling.
- Keep elbows and arms straight at all times during this lift.

Movements

- Lift weight until it is directly over the chest.
- Lower the weight until it rests on the thighs.
- Return the weight to the position directly over the chest.
- Return to starting position with arms extended over head.



Bent Arm Pull Over

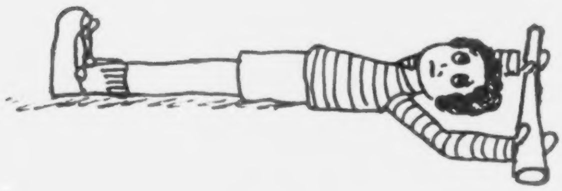
Different sections of involved muscles and muscle groups can be used in this lift by moving the hands closer than the specified shoulder width spacing.

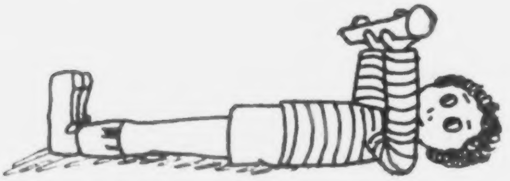
Starting Position

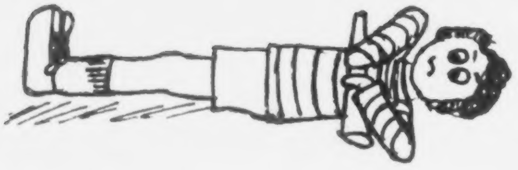
- Lie on the floor or on a bench.
- Hold bar with palms of hands facing the ceiling.
- Bend elbows so bar starts from a position directly behind the head.
- Keep elbows bent fully throughout all movements in this lift.

Movements

- Bring weight as far forward as possible.
- Return weight to starting position directly behind the head.







Supplementary Exercises

A variety of exercises can be used to supplement and complement basic weight or resistance training lifts. These exercises are also designed to enhance overall development of general muscular strength and endurance. Exercises presented emphasize muscles and muscle groups not stressed in the basic weight or resistance training program and/or emphasize muscles or muscle groups antagonistic to those stressed in the basic weight or resistance training program.

The nature of these exercises is such that a variety of ways can be used to record progress indicative of increased muscular strength and endurance -

- Maximum or specified number of repetitions with no time limit.
- Maximum number of repetitions within a specified time limt.
- Length of time required to do a specified number of repetitions.
- Interval approach in which a maximum number of repetitions is done within a given time; this is followed by a rest interval, after which the exercise is repeated. This alternate exercise--rest pattern is continued for the desired number of sets. By increasing the length of exercise time and reducing the time of rest intervals, harder and more beneficial training sessions result.

Suggested supplementary exercises can be done at the completion of the basic weight or resistance training workout or interspersed with the basic lifts. Consistency in sequence and placement of these supplementary exercises are important so that they remain an integral part of and contribute to personal goals and objectives of these portions of a comprehensive training program.

Definitions

Repetitions - number of consecutive or uninterrupted times a specific lift is repeated or performed.

Set - number of times a specified number of repititions for a given lift is repeated in a single workout or training session; this program is designed for one set of each lift although two or three may be used to break a sticking point.

Sticking Point - a weight for which a specific number of repititions cannot be increased after several workouts or training sessions.

Flexion - muscular contraction causes ends of involved bones to move closer together (i.e., wrist and hand move closer to the shoulder with flexion of the elbow).

Extension - muscular contraction causes ends of involved bones to move further apart (i.e., wrist and hand move further from the shoulder with extension of the elbow.

Agonist Muscles - one set of muscles or a muscle group.

Antagonistic Muscles - set of muscles or muscle group thatfunctions in opposition to agonists (i.e., as one muscle group contracts the other relaxes; one muscle group controls flexion of a given joint while its antagonist controls extension).

Wrist Rotary

This exercise can be done in either a standing or seated position.

Starting Position

- Make a wrist rotor with a ten pound weight, length of rope approximately equal to the athlete's height, and a piece of broom stick or wooden dowel twelve to eighteen inches long. Tie the rope to the weight and through a hole drilled in the broom stick or wooden dowel. Substitute a bleach bottle partially filled with sand or dirt for the weight.

- Hold the wrist rotor device by the broom stick or wooden dowel with palms of hands facing down.

- Extend arms directly from the shoulders so that elbows are straight and arms remain parallel to the floor throughout the exercise.

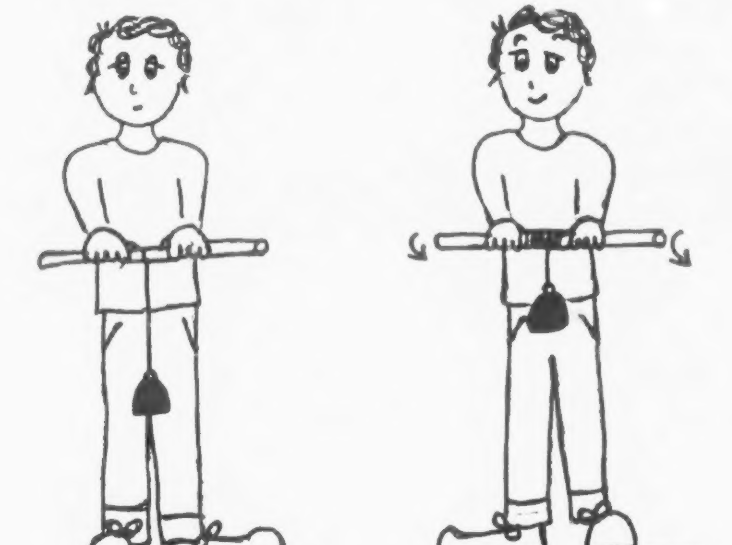
Movements

- Let rope out gradually so the weight is slowly lowered toward the floor.

- Reverse direction of the turn so that weight is slowly raised back to the broom stick or wooden dowel.

- Reverse positions of hands and repeat, lowering and raising the weight with palms of the hands facing upward.

- Add still another variation by performing basic lowering and raising movements with the palm of one hand. facing down and the other facing upward. Be sure to reverse hands when using this pattern so each palm faces down and up during the exercise.



Bar Dips

A modified version of this exercise can be done using the handles of a conventional wheelchair.

Starting Position

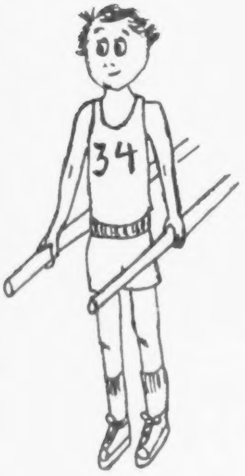
- Take a position on the end of a parallel bar or a special bar dip station found on some multistation exercise machines.
- Place hands on the outsides of the bars with palms facing inward and thumbs around the insides of the bars.
- Start in a vertical position between the bars with arms and elbows straight.

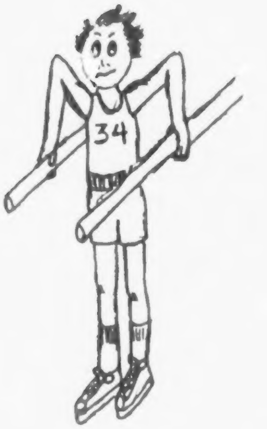
Movements

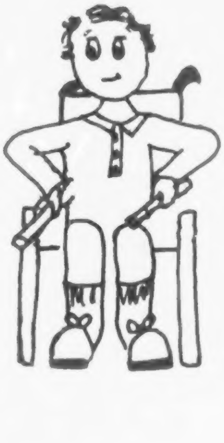
- Bend the elbows and flex the arms so that the body is lowered gradually between the bars.
- Continue this downward movement until the shoulders are level with the bar.
- Return to the starting position by straightening the elbows and extending the arms.

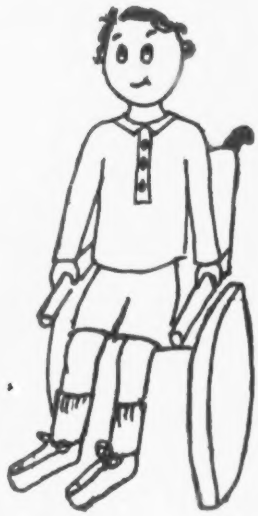
Alternate Movements

- Hold basic starting position for specified lengths of time if unable to do full or partial bar dips.
- Do one-quarter, one-half, or three-quarter bar dips as part of a progression to build up to the full movement.







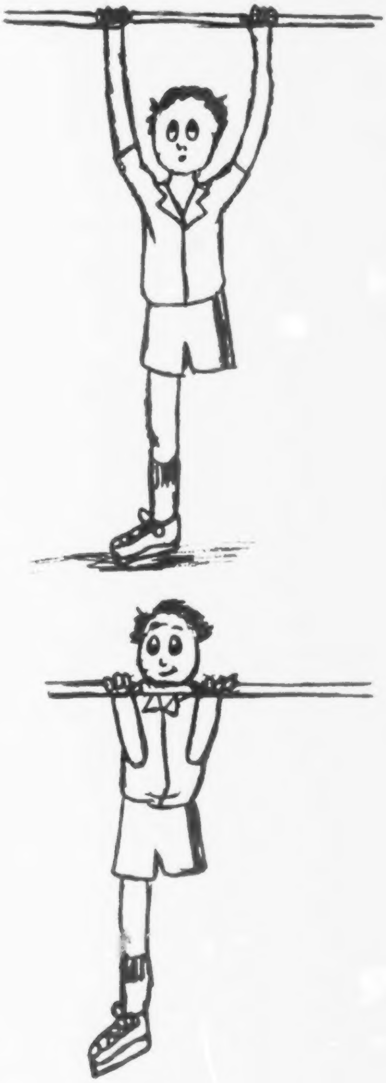


Pull-Ups

This exercise can be initiated from either a standing or seated position.

Starting Position

- Hang from a horizontal bar or an appropriate substitute bar.
- Hold bar with palms of hands facing in the same direction as the body (overhand grip) and thumbs wrapped under and around the bar.
- Keep arms and elbows straight while in this position.



Movements

- Bend the elbows, flex the arms, and pull the body straight up until the chin is above the bar.
- Return to the starting position.
- Avoid letting the body swing and using hip or other leg movements during this exercise.
- Change to underhand grip in which palms of the hands face back toward the body so that the little fingers are next to each other on the bar.
- Add other variations by using mixed grip in which one palm faces in and and the other out and/or moving the hands closer than the standard shoulder width.

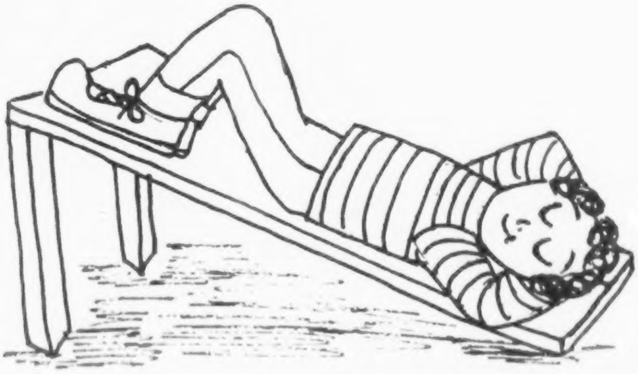
Alternate Movements

- Use a flexed-arm bar-hang in which the chin is held over the bar for as long as possible as an alternate for or supplement to pull-ups.
- Use a straddle chin in which a broom stick or wooden dowel is placed across the seats of two chairs; an athlete takes a supine position on the floor holding the broom stick or wooden dowel much in the same way as for the bench press. From this position,keeping the body straight throughout the exercise, the individual does modified pull-ups or straddle chins or modified flexed-arm bar-hang. This modification can also be accomplished by having one partner stand astride an individual who is supine so that pull-up movements are done with partners holding each others hands and wrists.

Abdominal

Starting Position

- Bend knees and keep feet flat on the floor.
- Place hands and interlace fingers behind the head so that elbows are touching the floor or slant board.
- Strive to do this on a slant board placed at a forty-five degree or greater angle.

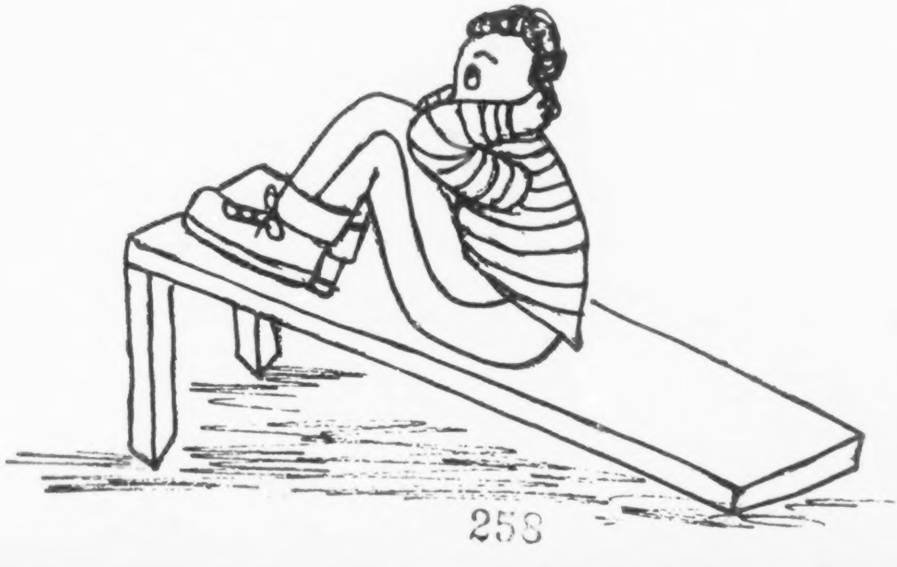


Movements

- Sit up and either touch both elbows to the knees simultaneously or touch one knee and then the other on alternate turns.
- Return to the starting position being sure that the elbows touch the floor or slant board.

Alternate Movements

- Change difficulty of this exercise by (1) extending or bending knees, (2) holding or not holding ankles, and (3) extending arms and hands overhead, placing arms and interlacing fingers behind the neck, or folding arms across the chest. Twelve sit-up variations are possible through different combinations of these changes.
- Use a rocking chair exercise in which partners sit with legs spread, ankles of one over the ankles of the other, and hands held. Alternately each partner pulls the other one from supine to sit-up position.
- Do these exercises flat on the floor if unable to be successful on a slant board, gradually increasing the pitch of the slant board.



Swing Bell

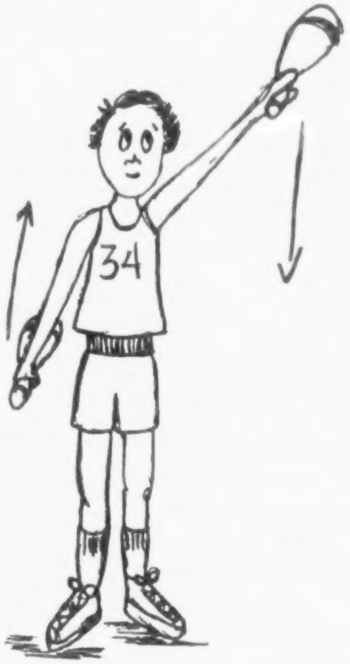
These exercises can be done in either a standing or seated position.

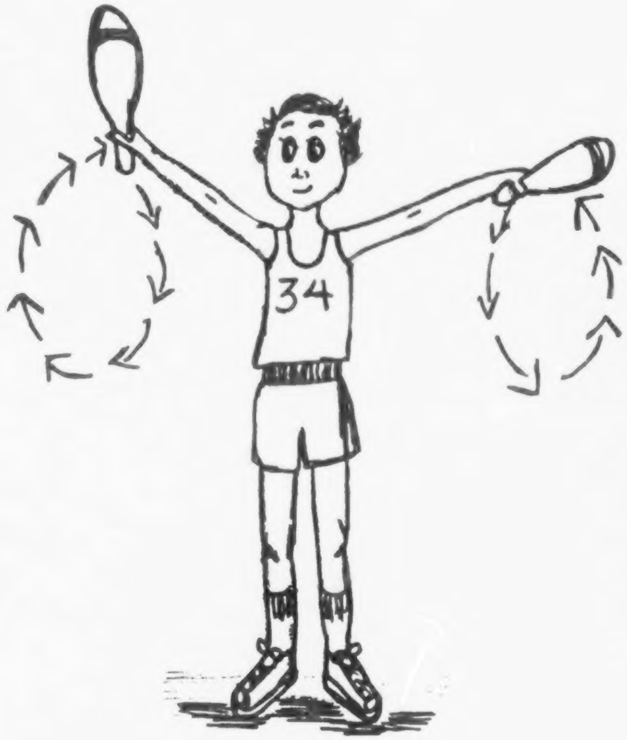
Starting Position

- Hold individual resistance objects--hand dumbbells, swing bells, bleach bottles partially filled with sand or dirt--in one or both hands.
- Determine exact starting positions according to specific exercises to be done.

Movements

- Swing weights freely in circles overhead, in front of or to the side of the body, behind the body, between the legs.
- Swing weight from side to side turning the body as far as possible.
- Twist and turn weight overhead.
- Do alternate curls and reverse curls.
- Do lateral raise--hold weight at end of fully extended arm--in standing, sitting, or lying positions, keeping arms and elbows straight throughout the movements.





Section III

Practical Pointers for Organization and Administration

PRACTICAL POINTERS

COMPUTER APPLICATIONS IN PHYSICAL EDUCATION AND SPORT FOR THE DISABLED

Julian U. Stein

Computer technology has been a fact of life for a number of years. Practical uses and functional applications have been slow to come in education in general, and physical education and sport in particular. However, word processing and spread-sheet uses continue to be rather commonplace. Some administrative applications can now routinely be found in school systems and individual schools--e.g., reporting grades to students and parents, record keeping of various kinds, scheduling, fiscal control and monitoring, and inventory tracking. Some instructional uses include computer assisted instruction, analyses of physical fitness performances, developing and monitoring weight training programs, test construction, grading and analysis, individualizing and personalizing instructional topics, methods, and techniques, including developing and monitoring individualized education programs (IEPs), and reporting to students and parents.

Researchers routinely use computers for statistical analyses of data in more complex and sophisticated ways that would not be considered, much less possible, without computers. Analyses of sport skills, especially of elite athletes, are performed through the complex digitizing process as well as with coordinated applications of cinematography and force plates integrated with computer and graphic displays. Some of these same processes are used for gait analyses of individuals with conditions affecting mobility (e.g., cerebral palsy, muscular dystrophy, polio). Some coaches use computers for scouting purposes and statistical analyses of their own teams and athletes. Potential is unlimited.

Expansion of availability of personal computers with larger memories and faster accessibility to these memories makes it possible for computers to perform duties and fulfill responsibilities of the exact type desired by their masters. Yes, computers are obedient servants, ready, willing, and able to do whatever we want and when we want.

Many computer applications, including those in the psychomotor domain, can be of immense value to teachers and other individuals working with persons possessing various handicapping conditions. One's imagination is the only limiting factor in such uses of computers. Continuing advances make computers more powerful than earliest mainframe systems of little more than fifty years ago. Increasing memory capacities, hard disks, speed of operations, combined with interactive videos make potential uses and contributions of these electronic wizards even greater in the future. Competition among companies--distributors as well as manufacturers--has made procurement of computer units well within budgets of virtually all schools and many families. Today it is the unusual school that does not have computer labs and hardware available for student and teacher uses, including use in physical education and athletic departments. In some parts of the country schools can obtain computers, including peripherals such as printers, through efforts of various grocery chains.

Some Guiding Principles

As with any major change or new innovation, some individuals are reluctant users while others see the computer as a panacea to solve all their problems. Neither extreme is correct nor appropriate. Several principles and factors need to be considered and kept foremost as computers are explored and introduced in physical education, sport, and recreation programs and activities of all types and descriptions.

- A computer functions with the same basic parts as any information processing system--input (eyes, ears, and sensory organs of the computer), usually by keyboard, disk, or tape, although voice and written input are far from figments of someone's imagination; processing (brain of the computer), the microprocessing unit; and output (response of the computer), usually display monitor, hard or printed copy, or to a disk for storage or future uses.

- A computer is little more than a calculator with memory. However, capacity and complexity of the memory and the speed and power at which the computer can be accessed make exciting results not only possible but routine and rather commonplace. Teachers and leaders can do things that would not be considered without a computer!

- A computer does not think; it merely does what it is told, which can be vastly different from what is intended or desired. An old but true expression applies to computers--GIGO (garbage in, garbage out!).

- Not all activities and tasks are as appropriate or efficient when computerized as when done manually or in other noncomputerized ways. Determine tasks that are appropriate and efficient opposed to those which are inappropriate and inefficient--do not simply change mode of presentation from paper and pencil to computer unless there are sound reasons and justifications. Interest and motivation can be such factors because of possibilities for reinforcement through immediate feedback and knowledge of results.

- Novelty factors and considerations of computer uses have not been determined--what happens to an individual's new found interest and motivation when the computer becomes old hat?

- Computers will not and cannot replace teachers any more than the advent of chalkboards, books, and audiovisual materials; some teacher roles and functions should be augmented by this powerful tool available for our use.

- Getting appropriate software or programs to meet exact and specific needs can still be difficult. However, do not compromise your needs simply to get software which is not what is really needed or desired. Be prepared to develop your own programs so they are tailored specifically to your needs. Do not overlook students as valuable and competent resources in the programming process.

- Real differences exist between being computer aware and computer literate--know your stage and level of development, but continue to learn, grow, and progress. As an individual who daily deals with attacking problems in systematic ways, or as one who applies processes such as scientific method, systems analysis, and task analyses, you already have basics for developing logic and flow of programs. Coding is the process by which individuals translate program logic and flow into language the computer can understand and activate. Within this context one individual can program and not code, while another can code and not program.

- Computer programming can in and of itself be a valuable experience and tool in working with children and adults who possess various handicapping conditions; the process forces one to be systematic and work in small and manageable bites (pardon the pun!). Success and positive feedback are immediate so as to help redirect the failure-frustration cycle so prevalent in many children and adults with handicapping conditions.

Equipment Modifications

Additional computer opportunities can be provided for individuals with severe physical disabilities. These can involve special adaptations of joy sticks found in many personal computers for game uses. Actually, joy stick circuits consist of on-off switches--in one position a circuit is on; in another position that same circuit is off. By replacing joy sticks with switches of different kinds individuals with extremely limited movements can activate computers for a variety of purposes. For example--

- Large push button switches can be used by individuals who cannot use their fingers or hands by activating with clenched fist, forearm, or elbow.

- Similar big push button switches can be used by individuals who have no use of their upper extremities but can activate the switch with the feet rather than fingers, hands, or elbows.

- Micro-switches of different types can be appropriate for individuals who can use their fingers but for whatever reason cannot use keyboards in traditional ways. Some micro-switches can also be activated by fists, forearms, elbows, or feet.

- Mouthsticks, commonly used for drawing, writing, or dialing telephones, are also quite effective for activating computers through direct applications to keyboards. Mouthsticks can be held between teeth or supported in specially designed head/forehead bands.

- Photo-electric cells can be activated by various minimal movements--e.g., a finger or even the head. When activated, photo-electric cells turn switches on or off.

Switches of types that have been described make it possible for individuals with severe disabilities to be actively involved in a variety of activities dealing with physical education, sport, and recreation. These can be related to sports and games themselves, including play, rules, and strategies. Only limitations are those imposed by imagination, creativity, and resourcefulness of teacher, coach, or leader--and student.

Voice synthesizers also enable individuals to become more a part of--rather than apart from--classmates, friends, and families. These synthesizers make it possible for an individual with no speech--whatever the reason or cause--to talk, have a voice all his/her own. Technological advances make these synthesizers portable and possible to be taken anywhere and used at anytime in any situation. Communication is now a reality for many who only a short time ago could look forward to a life of silence and only nonverbal communication.

The same technology that made voice synthesizers realities makes it possible for sound--including verbal output--to be part and parcel of virtually all personal computers. In this way the computer can talk to and even sing to its user. Imagine the thrill and glow when an individual does a curl up for the first time and a big smiling face on the computer screen greets the success with a "That's great, Johnny! This is the first time you have done a curl up--super and congratulations." Immediate, positive, and specific feedback and reinforcement are right there on the spot and at their very best. Can't you see this youngster's smile back at the computer, even if he/she is totally nonverbal?

Instructional Applications

Computers are increasingly being used for instructional tasks related to the cognitive domain. However, often overlooked are many ways in which computers can be used in the psychomotor domain. Computers can contribute directly to an individual's development of physical and motor fitness, development of fundamental motor skills and patterns, and development of skills in aquatics, dance, and individual and group games and sports. Some uses and applications of computers in the physical and motor areas are little different from typical uses in classrooms and other educational settings. On the other hand, some specific and unique computer applications can be beneficial in the physical and motor areas.

Some computer uses and applications can be found for instructional physical education. For example, programs and software packages have been developed and are available which deal with sports rules, strategies, skills, and techniques (Sport Terminology, Sport Quiz Series, Sport Concept Series). These provide opportunities for students to gain information and develop knowledge about sports in general and aspects of specific sports in particular, review various factors about sports, take practice and real tests. Some of these programs (e.g., Volleyball, Volleyball II, Serve and Volley) have excellent graphic routines that minutely show execution of basic skills (e.g., bump, set, serve in volleyball) and position play (e.g., positions themselves and rotation in volleyball). A number of commercial outlets have available software packages that deal with specific sports--i.e., **Football** (Football Classics, NFL Football, Super Bowl Sunday, Football); **Basketball** (Basketball Challenge, Fast Break, NBA Basketball); **Baseball** (Batter Up, Major League Baseball, Earl Weaver Baseball, Sporting News Baseball); **Soccer** (Soccer); **Ice Hockey** (Ice Hockey); **Track and Field** (Track and Field, Jogger). Olympic Decathlon is an excellent program to learn about these ten track and field events while at the same time developing an understanding of basic skills in executing each of these events. Summer Games and Winter Games are other software packages from the Olympic collection.

In some instances different sports are made available in volumes. Representative of such volumes, their sports and organization are **Individual/Dual/Team Sports**--Archery, Basketball, Football, Softball/Baseball, Badminton, Bowling, Golf, Volleyball; **Aquatic Sports**--Boating/Boat Safety, Fishing/Bait Casting, Water Skiing, Canoeing, Sailing; **Swimming Rescue**--Diving, Personal Water Safety, Swimming Techniques/Stroke Development, Lifesaving, Survival Swimming; **Winter Sports**--Alpine Skiing, Cross Country Skiing, Ice Skating, Snowshoeing, Curling, Ice Hockey, Snowmobiling.

It appears that full realization of computer potential for students with exceptional needs in physical education and sport is not being attained. An exception to this was reported about a student in Columbia Heights (Minnesota) Secondary School. A young man with spina bifida was scheduled for adapted physical education. He actively took part in a variety of aquatic activities including swimming and scuba diving. Computer programs were used as a means for him to learn basics of sports such as football and basketball. In addition to computer software which included football and basketball games, official rule books, player handbooks with plays and strategies, and noncomputer games were used to help this student develop knowledge and understanding of specific sports. Student and teacher attended school games to use and apply further what had been learned in adapted physical education classes. As a sophomore and for the rest of his high school days this young man served as official statistician for the varsity basketball team. He not only kept all necessary statistics but provided players and coaches with computer analyses of game and season statistics for each player and the team as a whole. Through adapted physical education and computer uses this young man had become extremely knowledgeable in basketball and had become an integral and important part of the total school community.

Individual and Dual Sports

Some computer bowling games (The Perfect Bowler, Bowling) are extremely realistic. Bowlers can determine starting positions on the lanes depending upon the situation--near the middle for the first ball, on the appropriate side for 7-8, 9-10, 1-3-6-10, or any combination of splits. Straight balls or hooks can be chosen by the bowler who can compete against self or another individual. Official scoring is done automatically by the computer. Hardware can be modified allowing individuals with severe disabilities to use an appropriate switch.

With just minor changes this computer program can be an excellent instructional aid for teaching an individual to score in bowling. Rather than the computer giving the score, whether determined by adding number of pins knocked down in succeeding frames or incorporating additions resulting from strikes or spares in whatever combinations, the bowler puts in the score. The computer compares score entered with the correct score and provides appropriate responses to the bowler. If an incorrect response should be given, the computer can be programmed to guide the individual to the appropriate score. If a correct score is initially given the computer then provides positive feedback and reinforcement in visual and/or verbal means. With this addition the computer bowling game becomes more of an instructional, rather than purely recreational game.

Computers can also provide assistance to blind bowlers! Miniature devices with all ten pins can be attached to visual feedback devices which tell a sighted bowler pins that have been knocked down and ones left up. Pins knocked down fold up on the device so the blind bowler can tell by feel which ones are still up so the next attempt can be planned appropriately. These devices can also be used in scoring so blind bowlers can participate independently in the activity on a recreational or competitive basis. Voice synthesizers can also be used to provide feedback to blind bowlers, and scoring can be done automatically with this information also provided verbally. Pioneers, an organization of retired telephone workers found in most large cities, can provide assistance in making and adapting devices of the type just described.

Other bowling programs include Bowling Series and Strikes and Spares. Software packages and programs available in other individual and dual sports include: **Golf**--Pro Golf Challenge, Gnarley Golf, World Tour of Golf, Zany Golf, Swing Surgeon--Compu-Golf, Jack Nicklaus Golf, World Class LB Golf, Golf Classic, Fore! [Golf Simulation], Golf Statistics; **Bicycling**--Bike Series. Programs are also available for gymnastics, tennis, and wrestling, as well as various aspects of dance.

Activities Simulation

Computer simulation presents additional untapped opportunities in physical education and sport for individuals with disabilities. Many outdoor activities can be introduced through computer simulation (Wilderness: A Survival Game, John Rae Survival Series.) Handling small craft in calm to white water can be done on a computer screen! Path of travel is programmed onto the screen so the participant must control the craft by using directional arrows (i.e., <----, ---->,↑,↓) on the computer keyboard. These paths can be straight and easy, follow twisting and curving river or stream beds, and include obstacles such as rock formations. Speed of the water can be controlled from slow to extremely fast. All conditions of the real world can be incorporated into such a simulated adventure.

Similar simulated experiences can be developed and made available through computer programming in other activities: **Canoeing--**Up the Creek, Paddle Power, Canoeing; **Sailing--**The American Challenge, Sailing; **Skin or Scuba Diving; Water Skiing; Orienteering--**Jenny's Journeys, Trail Blazers; **Camping; Downhill and Nordic Skiing--**Downhill Challenge; **Cycling; Hiking--**there are few if any limitations!

Switches (as discussed previously) can be installed in ways to provide means of control for individuals with severe physical limitations. For some, using a computer sport program could be introduction and prelude to real world activity, much in the same way simulators are used in driver education and flight training. For others, because of types and severities of their conditions, these could be the extent of their involvements in such aquatic and outdoor activities. In these as with other types of computer simulated activities, coupling computer with videos (interactive videos is the technical term!) adds to realism of the activity itself. This concept has been used successfully in driver education simulators and various computer games found in commercial arcades, and is now finding its way into the marketplace as part of a variety of sport games. The Great American Road Race deals with auto racing.

These other sources--commercial games and activities--have many uses to enhance quality of life for many individuals with various disabilities. These do not have to be used simply for individuals to pass time, but can serve many purposeful educational goals and objectives and instructional uses that provide foundations for constructive use of leisure, free, and uncommitted times. As in so many cases, devices and activities are neither good nor bad, constructive or nonconstructive; values depend on ways in which such devices and activities are used. This is as true with computer applications in physical education, sport, and recreation as with any other activity or approach.

Perceptual Motor Applications

Success in many computer activities, including games of varied types and descriptions, depends upon various perceptual motor/visual motor skills--e.g., reaction and movement times, visual tracking, visual discrimination, figure-ground discrimination, hand-eye coordination, laterality, directionality, motor planning. Concentration, understanding of task and all involved in it, and motivation are other factors which help determine an individual's degree of success in such computer activities.

Paper and pencil and physical activity perceptual motor/visual motor tests and tasks abound to measure an individual's performances in these areas. Many, if not most, of these tests and tasks can be presented through computer applications (Classic Concentration, Super Boulder Dash). Basic to many perceptual motor/visual motor assessment scales are such specific tasks as tracing mazes, connecting dots, drawing a line between two lines at different distances from each other, determining reaction time. Each of these tasks has been converted and translated into a comparable computer task.

Examples of four computer programs (**) developed to assess the same visual motor and perceptual motor characteristics as found in many traditional tasks and tests include--

> Response Speed (JTSTIME/TXT)--student places preferred hand over the keyboard and watches the screen for commands Ready, Set, Go. When Go appears--times between each set of commands are randomly controlled--any key or the space bar is depressed to stop the line made by the descending cursor. The score--response time--is the amount of time it takes to react; a maximum (poor) score is equivalent to .75 seconds.
>
> Visual Motor Control (controlling cursor [dot] through progressively difficult mazes) (AMAZE/TXT)--student moves the cursor through each of three increasingly difficult mazes using various combinations of directional control keys (<----, ---->,↑,↓). Errors are recorded when the cursor is not kept in the path of the maze; the longer out of this path, the greater the number of errors.

(**) Computer programs described in this section were developed and programmed by Jay T. Stein when a student in the College of Engineering, Virginia Polytechnic Institute and State University, Blacksburg, Virginia. Additional information about these programs can be obtained from Julian U. Stein, Route #3, Box 317-A, Oliver Springs, Tennessee 37840.

Visual Motor Control (connecting vertical lines with preferred hand) (JTSBARS/NO 1)--student places hand over the keyboard and watches the screen for commands Ready, Set, Go, as in the Response Time task (time between each pair of commands is random). When Go appears the cursor (dot) moves down the screen toward a pair of horizontal lines extending across the screen. The objective is to strike any key when the cursor reaches the first horizontal line and again at the second line, connecting the two horizontal lines together. To strike a key before the cursor reaches either of the horizontal lines or after it passes either of these lines is an error; a maximum of two errors is possible per trial! Five repetitions are scored for each of up to ten sets of horizontal lines. Each succeeding pair of lines requires greater concentration and more skill as lines get progressively thinner and closer together. Two automatic scoring approaches--weighted and unweighted scores--are included in this program.

Visual Motor Control (striking keys with preferred hand) (TAPPITY/NO2)--student strikes as many keys in order as possible with preferred hand in a six second period. Keys must be struck beginning with the left most key on the top row (1), progressing across this row followed by the second (q, w,. . .p [,]), third (a, s,. . . ;, '), and fourth (z, x,. . . /) rows of keys, all from left to right. Should an individual complete all four rows of keys within six seconds, the process continues from the top row again until time expires. A key struck out of order is recorded as an error so one's score is tabulated and presented by the computer based on total number of keys struck minus number of errors.

Many computer games require some of these same visual-motor and perceptual motor skills for the player to be successful. For example, in Hustle the player tries to hit with the cursor boxes that randomly appear and disappear from different places on the screen, remaining for different lengths of time. The cursor is moved by directional control keys (<----, ---->,↑,↓). However, to backtrack or reverse direction so the cursor immediately changes direction 180 degrees (moves back toward the direction from which it was coming), or permit the cursor to touch the border or itself (the cursor gets progressively longer as the game continues) immediately ends the game. Obviously, the longer one continues, the higher the accumulated score. With careful selection and creative uses, computer games such as Hustle can be used to help students develop and improve upon selected visual motor and perceptual motor skills. Right of Way is a program that deals specifically with laterality and directionality.

Physical Fitness Uses

A major use of computers by many physical educators, including those in adapted physical education, is in monitoring and reporting student status and progress in physical fitness tasks and tests. Among the many applications are maintaining individual scores, both raw and standard (usually expressed in percentiles although some now provide criteria indicative of appropriate performances for adequate health and wellness), comparisons between fall and spring test administrations, tabular and graphic displays of individual performances including how they compare to specific standards or criteria, interpretations of what each test item measures and what scores mean, and suggestions of how to improve performances reported.

Even though today there is no uniformly accepted physical fitness test as in the past with the Youth Fitness Test, a great variety of software is available for use with various fitness tests. Determining which to use has to be based on the test being administered. Representative of the many computer programs available are--

* Dino-Fit Physical Fitness Software (ARA Human Factors, 15312 Spencerville Court, Burtonsville, Maryland 20866).
* Fit America (CompTech Systems Design, P.O. Box 516, Hastings, Minnesota 55033).
* Fit-N-Dex for Physical Education (Cramer Software Group, P.O. Box 1001, Gardner, Kansas 66030).
* Fitness--A State of Body and Mind (CompTech Systems Design, P.O. Box 516, Hastings, Minnesota 55033).
* Fitnessgram (Institute for Aerobic Research, 12330 Preston Road, Dallas, Texas 75230).
* Fitness Programming (Gary Chase, College of Physical Education, Pacific Lutheran University, Tacoma, Washington 98402).
* PE Data (B.J. Stephens, 5053 Shelby Drive, Birmingham, Alabama 35242).
* Physical Best (American Alliance for Health, Physical Education, Recreation and Dance, 1900 Association Drive, Reston, Virginia 22091).
* Physical Fitness Assessment (CompTech Systems Design, P.O. Box 516, Hastings, Minnesota 55033).

- President's Challenge (President's Council on Physical Fitness and Sports, 450 Fifth Street, N.W., 7th Floor, Washington, D.C. 20001).

In addition to listed software, there are many other computer programs, often designed to assess either performance or non-performance fitness characteristics. In many cases such programs have been developed by physical educators for use in their own programs. An example of this is The George Mason University Physical Fitness Profile which was designed to be used with the Youth Fitness Test or AAHPERD Health Related Test and also incorporated existing norms for students with handicapping conditions. An excellent source to obtain information about such locally generated programs is Softshare (c/o Sally Ayer, Physical Education and Human Performance, California State University, Fresno, California 93740). Even though most of the listed programs are designed for use with able-bodied students, many of them can be adapted for and applied to students with handicapping conditions.

Additional individual programs and software packages have been designed for specific fitness components such as muscular strength and endurance through weight training, body composition, and aerobic/cardiorespiratory functions through running, jogging, or walking. Representative examples of such programs include: **Weight Training**--Weight Training, Strength Training Prescription (includes individual programs for specific sports); **Aerobic/Running**--Improve Your 10K Time, Step Test, Aerobic Evaluation and Exercixe Guildelines, 12-Minute/1 1/2/1 Mile Run Analyses, Jim Fixx Running Program; **Body Composition**--Personal Body Profile. Locally developed programs abound in these areas also.

Health Applications

A variety of computer uses and applications add greatly to all aspects of health education, especially in cognitive and affective domains. Representative of the many specific programs and software packages available are Health Awareness Games, Health Risk Appraisal, Health Watch, Wellness Pursuit, SMoking: It's Up to You, Coping with Stress, Who Am I?, Assertiveness Training, Personality Profile, Stress Management, Cardiac and Stress Assessment. Many programs and software packages deal with such health topics as health maintenance; nutrition; body systems (anatomy and physiology); conditions such as cancer and heart disease; family life and sex education, including AIDS and venereal disease; substance abuse including tobacco, alcohol, and drugs; first aid and safety; and driver education. These are readily available from a variety of sources.

Although few if any of such programs have been developed specifically for use with students having various handicapping conditions, most all are appropriate for and applicable to students with special needs. In some cases accommodations may have to be made for specific students possessing certain handicapping conditions. However, for the most part, these are the same types of accommodations that are made for these same students in other classroom settings and situations.

Physiology of Exercise Applications

Packages which include both computer programs and specific types of hardware are available and can be used to show various physiological responses and reactions to exercise and activity (Experiments in Human Physiology, Cardiovascular Fitness Lab, Biofeedback Microlab). These can be used in physical education and sport programs involving participants with disabilities in exactly the same ways they are used with able-bodied persons. Analyses of effects of such factors as exercise intensity, frequency, duration, and type can be done with materials contained in these packages. Other analyses of fitness, health risk factors, and results of active participation in different activity programs can be determined by using any one of a number of commercially available computer programs.

Programs are also available in the area of motor learning. Representative of some of these programs are Physical Skill Manager, Physics of Sport--Basic Motor Learning, Physics of Sport/Activity Kit.

Individual Education Programs

Individualized education programs (IEPs) can be required and necessary in physical education as in other areas in which exceptional students have special needs. While I do not believe any computer can generate a valid and truly personalized IEP, computers can facilitate the process and reduce some of the tedium and time associated with the IEP process.

When personal information about a student is fed into the computer along with other relevant information, including assessment results, a list of long-term goals appropriate for the individual can be obtained from a data bank of such goals stored in the computer and coded for retrieval. However, selection of specific goals to be used with a given child must be left to the IEP team and human decisions guided by personal experience, professional knowledge, and cooperative teamwork among parents, teachers, and administrators.

Once long-term goals have been selected, short-term instructional objectives can be retrieved from a data bank in the computer. Again, selection of the most relevant and appropriate of these objectives remains the responsibility of the human team.

The same process can be followed in obtaining potential activities, feasible methods, and possible accommodations for specific purposes for *each* student. Input from and experiences of people in many different places can ultimately impact upon each child through computer uses and applications.

Once all elements and provisions of the IEP are determined, the computer can contribute and streamline the process further. Data about performances can be processed into the computer so progress can be monitored and presented in many different ways including a variety of graphic displays.

Information generated by and selected for the computer can now become the basis for reporting to parents and others interested in the child. Time saved by using a computer for different administrative, routine, and repetitive tasks is important and should not be minimized. Time not devoted to noninstructional tasks enables teachers and leaders to spend more time in more efficient and effective learning situations and circumstances for each and every student. Programs specifically designed to assist with IEPs include *IEP Writer and Lesson Planner*, *IEP Generator*, and *CHRIS* (Concord Habilitation Resource Information System).

Final Words

Computer programs and software are available in many administrative, support, and supplementary areas. These include grading and reporting to students and parents; athletic administration; tournament planning and scheduling; records management; assessment and evaluation; statistics; monitoring student progress; award and certificate makers; making signs, posters, and announcements; making cross word puzzles and word find games.

Various utilities extend and expand possibilities and potential for every personal computer. Voice input modules and photo imagers are not things of the future--they are here *now* and available as specialized products for personal computers.

While some good and appropriate programs and packages are available commercially, often the best way to meet specific needs is to program yourself or have software developed for you. Many sources are available to assist in this process if you don't program (code). For example, in schools one can work through the system's data processing/computer programming department. Don't overlook students who have their own PCs (personal computers) at home or are taking computer courses at school; they and their teachers are often looking for real and meaningful projects. Avoid just turning them loose, however. Provide them with guidance and direction of exactly what you want and what you want the program to do; working as a team will bring about desired results.

PROGRAM SOURCE LIST

Computer programs not already referenced within this POINTER are available as cited below:

Program	Source
American Challenge	Mindscape
Aquatic Sports	CompTech
Assertiveness Training	CompTech
Basketball Challenge	XOC Corporation
Batter Up	Avant-Garde
Bike Education Series	CompTech
Bowling Series	CompTech
Canoeing	CompTech
Cardiac & Stress Assessment	CompTech
CHRIS	Concord Home for Mentally Retarded, Yellowspring, WV
Classic Concentration	ShareData
Coping with Stress	CompTech
Downhill Challenge	Broderbund
Earl Weaver Baseball	Electronic Arts
Experiments in Human Physiology	CompTech
Fast Break	Accolade
Football	CompTech
Football Classics	Radio Shack
Fore!	One Step
Gnarley Golf	Britannica
Golf Classic	Milliken
Golf Statistics	Micromatics
Great American Road Race	Activision
Health Awareness Games	CompTech
Health Risk Appraisal	CompTech
Health Watch	CompTech
Ice Hockey	Market Computing
IEP Generator	Queue
IEP Writer & Lesson Planner	Queue
Individual/Dual/Team Sports	CompTech
Jack Nicklaus Golf	Accolade
Jim Fixx Running Program	CompTech
Jogger	Parsons
ML Baseball	Microleague
NBA Basketball	Avalon Hill
NFL Challenge	XOR Corporation
Olympic Decathlon	EPYX
Paddle Power	CompTech
Perfect Bowler(TRS80, 3 OR 4)	Julian Stein (Rt. 3, Box 317, Oliver Springs, TN 37840)
Personal Body Profile	CompTech
Personality Profile	CompTech
PGA Golf Tour	Electronic Arts

Physical Skill Manager	CompTech
Physics of Sport	CompTech
Physics of Sport-Basic Motor Learning	CompTech
ProGolf Challenge	CompTech
Running Coach	Software Publishing
Serve and Volley	CompTech
Smoking: It's Up to You	CompTech
Soccer	CompTech
Sport Concept Series	CompTech
Sporting News Baseball	EPYX
Sport Quiz Series	CompTech
Sport Terminology	CompTech
Strength Disk	B.E. Software
Stress Management	CompTech
Summer Games	EPYX
Super Bolder Dash	Electronic Arts
Super Bowl Sunday	Avalon Hill
Swimming Rescue	CompTech
Swing Surgeon	CompTech
Track & Field	Market Computing
Trail Blazers	CompTech
Up the Creek	CompTech
Volleyball	CompTech
Volleyball II	CompTech
Weight Training	B.E. Software
Weight Training Prescription	B.E. Software
Wellness Pursuit	CompTech
Who Am I?	CompTech
Wilderness: A Survival Game	CompTech
Winter Games	EPYX
Winter Sports	CompTech
World Class LB Golf	Access
World Tour of Golf	Electronic Arts
Zany Golf	Electronic Arts

SELECTED RESOURCES

B.E. Software (Coopco Enterprises, Inc., 149 East Thompson Avenue, Suite C2, West St. Paul, Minnesota 55118, 612-451-2911). Software for strength training, including programs for specific sports (baseball, basketball, wrestling, track and field, football, swimming, racquet sports, swimming).

Computer Software for Sport, Physical Education, and Recreation--CASPER (School of Physical Education and Recreation, University of British Columbia, 6081 University Boulevard, Vancouver, B.C., Canada V6T 1W5, 604-228-3685). Programs available for use in motor, affective, and cognitive domains.

Directory of Computer Software with Application to Sport Science, Health, and Dance (Charles F. Ciccarella, Editor, for AAHPERD Research Consortium Computer Network Committee, AAHPERD, 1900 Association Drive, Reston, Virginia 22091, 703-476-3400). Directory designed to identify available software and from which developers and distributors each program or package can be obtained.

Microcomputer Software for Physical Education, Health, Athletics and Fine Arts (CompTech Systems Design, P.O. Box 516, Hastings, Minnesota 55033, 612-437-1350). Listings of technology products for health, physical education, recreation, and athletic communities.

Queue (562 Boston Avenue, Bridgeport, Connecticut 06610, 800-232-2224, [203] 335-0906, FAX 203-336-2481). A comprehensive educational software catalogue including all subject areas (health, special education, biology) and grade levels.

Softshare (c/o Sally Ayer, Physical Education and Human Performance, California State University, Fresno, California, 93740-0028, 209-294-2650/2016). Descriptions of non-commercial software in physical education and related areas which are in use in institutions throughout the United States.

PRACTICAL POINTERS

PLANNING AND IMPLEMENTING INTRAMURAL PROGRAMS FOR SPECIAL POPULATIONS

Susan J. Grosse

Intramural activities are structured games and sports which take place outside physical education classes, but within confines of a single school or single school group. They are co-curricular, offered in addition to all regular classes, and are scheduled outside of regular class time. Participation in intramurals is voluntary rather than required; students select activities based on individual interests and abilities. Often intramurals are extensions of class activities, giving students chances to apply knowledges and skills in realistic settings.

However, sometimes intramurals mean activities that are new and completely different from anything a student has ever done before. Opportunities abound for social interactions as well as for independence in individual activities. Organized competition can enhance participation while an open gymn can provide an atmosphere encouraging decision making and responsibility and another type of active participation. A well planned and well-run intramural program should provide something for everyone, no matter what their abilities and experience levels.

Unfortunately, special education students aren't often included in school intramural programs. Often these students are bussed to school and bus schedules leave little room for after-school activities. Students with special needs do not always fit into the mainstream of existing intramural activities. Staff members in charge of existing intramural programs are often already overburdened with work and have little time to develop programs for exceptional education students. Saddest of all, many educators feel that mentally retarded, or deaf, or blind, or physically handicapped, or learning disabled, or emotionally disturbed, or multiply-handicapped persons can't handle, aren't ready for, shouldn't have, can't participate in, aren't interested in, or don't know enough to be involved in intramurals!

Knowledge and skills are learned. Interest is something that is developed. That learning and development can only take place if opportunities are provided. This Practical Pointer is designed to give practitioners detailed information on how to set up and run successful intramural activity programs involving special populations.

The primary reference point here is the school-aged individual 10 to 21 years of age. This is the population usually included in intramural programs. Prior to age 10 children are more involved in learning basic movement and play skills. Recess is as close as these students usually get to activity outside of class. However, some information contained in the section on open gym activities can also be applied to recess settings. Persons involved in recreation programs for adults can easily apply information found here even though their populations are older. The same general principles of organization and administration apply, and many of the same activities can be used. In fact, one goal of an intramural program for young adults is to teach them activities and give them skills that can be used throughout their lives to occupy leisure time.

Activity development is considered from the point of view of a segregated setting. Needless to say, students who can participate on a mainstreamed basis in regular intramural programs, and for whom such programs are available, should do so. However, enhancing development of intramural programs for students who do not fit into the mainstream, or for whom no other program is available, is the purpose of this Practical Pointer.

Value of Participating in Intramurals

School time of exceptional education students is usually quite full. In addition to standard academic classes, many students also have speech and language therapies, occupational and physical therapies, extra sessions with reading or math resource teachers, special help from a mobility teacher, diagnostic testing, or counseling with the school psychologist or social worker. Combining this crowded schedule with the reality of these children being in special education because they need more help to learn (and that help takes time) means these are already very busy people! Why add something else to an already crowded schedule? Why add intramurals?

While intramurals do add to a student's schedule of activities, participation in intramural activity can make unique contributions to an individual's growth and development.

Intramurals--

- Provide opportunities for almost immediate applications of skills (physical as well as mental and social/emotional) learned in classes.
- Provide a real-life setting for applying skills, as opposed to artificial structure of a directed class.
- Provide opportunities for appropriate peer group interactions in recreational settings.
- Provide chances for persons with special needs to develop their own individual interests and avocational skills.
- Teach individuals how to select leisure activities and appropriately use leisure time.
- Help individuals develop skills and abilities usable throughout their entire lives.
- Provide change of pace relief from confines of the classroom, enabling students to relax and relieve tensions.

Rather than detract from the educational process, intramurals contribute to it in their own special ways. A well organized and run intramural program can greatly enhance learning for any exceptional individual.

Programing

A wide variety of programing alternatives is necessary to make an intramural program successful. Possibilities are limited only by creativity and flexibility of staff. Types of activities and organizational structures given these activities greatly affect successes of participants.

Types of Activities

Activities can be divided into three groups--team sports/large group activities, individual sports/dual activities, and table activities. Specific activities selected depend on--

- -- Interests of participants
- -- Knowledge and abilities of participants
- -- Instructional physical education program
- -- Knowledge and abilities of staff
- -- Equipment available
- -- Facilities available
- -- Space available

- Staff available
- Volunteer assistance available
- Parental support and encouragement
- Special education staff support and encouragement
- Time available
- Number of participants

No single factor is over-riding. Each must be considered to ensure high quality programs.

Team Sports/Large Group Activities

Some sports come to mind first when thinking of intramural team and large group activities--

basketball

flag/touch football

soccer

softball

volleyball

These are also sports most commonly found in physical education programs. Intramurals should be extensions of existing instructional programs; therefore, including sports that students learn in physical education classes is usually a good idea. Even if students do not know the sport very well or are not highly skilled, lead-up forms of sports and/or modified rules can be used.

Students with no background in physical education need to be taught. This does not mean that the intramural program becomes a physical education class. Rather, it is more like a coaching situation with leaders providing as much individualized help as necessary for everyone to get involved in activity. Mini clinics can be scheduled several times for all students who are interested or who think they would like to try an activity. Students can then participate in activities they may not already know or in which they are not highly skilled. After initial practice sessions those still interested can continue with a more organized form of activity.

But, team sports and games include many more types of activities than just the five already cited, such as--

beep baseball
broom ball/hockey
deck tennis
dodgeball
earthball
flag football
floor hockey
global ball
goal gall
ice hockey
kickball
lacrosse
scooter hockey
scooter soccer
speed-a-way
speedball
team handball
ultimate frisbee

Why not include New Games (Orlick, 1978; Fluegelman, 1976 & 1981) group activities? Actually, any activity involving three or more persons on a side can be considered a group activity. Where three people on one side play against three people on another side, you have a team sport. Program leaders shouldn't feel it absolutely necessary to adhere to rules for number on a team. Often with groups of special education students there just aren't enough students available to make up two official teams. Team sports with many people on a team are also much more difficult to understand and learn to play. Instead of official teams, it might be more fun to have four flag football teams with six players on a team. Then playing a round robin tournament would give individual players more action. Sometimes having official teams means less variety in opponent and individual players doing a lot of standing around while the same star players get all the action. Small teams give everyone chances to be actively involved. Improvise, modify, and create play situations appropriate to needs of students (Morris, 1989).

Picking Teams

Consideration of team sports would not be complete without discussion on picking teams. There is a variety of ways to do this, each having its advantages and disadvantages--

Captains pick. Captains are either elected by the group or appointed by the adult leader. They in turn pick team members from the entire group wanting to play. This is perhaps the most familiar way of arranging teams. However, it usually results in better players being picked first and the same, less skilled players always being picked last. Teams may or may not end up evenly balanced. To avoid student embarrassment during the picking process, captains may pick in private, selecting off a printed list of players. In this manner only captains know who was picked last. For sportsmanship reasons this information is better kept confidential. Because of psychological implications of captains pick, this is a less desirable method of team selection.

Leader pick. The adult group leader arranges teams, attempting to make them as evenly balanced as possible. The leader may also appoint the captain or the individual team group may elect its own captain. Teams usually do come out more evenly balanced -- and as a result, the tournament is much fairer. However this process does remove the decision making process from participants.

Draw. For teams arranged by draw, names of all participants are put into a box and teams randomly drawn. There is an element of risk here that increases interest in the selection process and teams usually come out pretty even if the group is fairly large (at least 20). Drawing with a small group is not usually effective as it is too easy for highly skilled players to end up on the same team.

Participants pick. It is also possible to place a small number of more experienced students in the position of the adult leader and ask them to arrange even teams. This helps provide for more even competition and gives some of the decision making process to participants. It is important for the adult leader to explain what even teams are, why they are important, and to act as advisor during team selection process.

No single system is foolproof. There will still be uneven teams. When that does happen, and extremely overbalanced competition results, it is important to talk to participants and explain what has happened and why it is important (in an intramural program) to try to have even teams. If the activity is a total disaster because of team arrangement, there is no reason teams can't be redone and activity started over with a better arrangement.

Individual Sport/Dual Activities

Any game or sport played alone, one-on-one, or two-on-two can be included in this classification. Common individual sport/dual activities include--

archery
badminton
bowling
golf
handball
racketball
table tennis
tennis

However, students might not receive physical education instruction in these activities until they are close to high school age. Students aged two to 14 or 15 participate in a curriculum that is primarily team sport orientated. Secondary school physical education programs have high concentrations of individual sport/dual life-time activities. Therefore, it may again be necessary, as part of the intramural program, to teach the sport first. Remember, just because students may have already had instruction in a sport doesn't mean they will be able to remember what to do or be proficient in skills. The greater the time lapse between learning and application, the greater the possibility activities may not be remembered. Review, particularly of rules, usually benefits everyone.

Other, less well-known but equally enjoyable individual sport/dual activities and sports include--

aerobic dance
arm wrestling
  (and other combatives)
bait casting
bean bags
billiards/pool
bocce
bumper pool
cross-country skiing
carnival games
croquet
dance contest
free throw shooting
frisbee
horseshoes
mini golf
paddleball
platform tennis
pickle ball
riflery
scoop ball
shuffleboard
tetherball
track and field
twister
weight lifting
wheelchair slalom
wrestling

With most individual sport/dual activities two competition options exist--(1) participate with or against another person; (2) solo participation to improve individual performances or compete against one's self or a pre-established personal goal.

Table Activities

When most people think of intramurals they think of gross motor/large muscle activities. But intramurals, particularly intramurals for special populations, also need the component of less physical, leisure pursuits. Some individuals may not enjoy active games and sports. Others may enjoy some sports but not all. Adults participate in other leisure activities besides team and individual sports. Among these additional leisure activities are table games. Here a table activity refers to something done while stationary rather than moving about and something requiring fine motor, rather than gross motor ability. Included in the concept of table activities are--

- academic reinforcement games (e.g., hangman)
- board games (e.g., Monopoly)
- box games (e.g., hockey)
- card games (e.g., hearts, cribbage)
- computer games (e.g., pac man)
- electronic games (e.g., electronic golf)
- paper and pencil games (e.g., tic tac toe)
- puzzles (e.g., jigsaw)
- sport simulation games (e.g., NFL Hockey)
- TV games (e.g., Wheel of Fortune)

Here it will not be possible to fall back on previous instruction in physical education as basis for program activities. Some students will have participated in table activities with friends or families, others will not. Lack of prior experience makes it especially important for table activities to be included in any intramural program for special populations. While they may not be included anyplace else in a child's education, table games are something in which these individuals will probably participate on a leisure time basis for the rest of their lives.

It will probably be necessary to teach the activity first so all who are interested can participate. Initially, players can play in pairs with a more knowledgeable player paired with and helping a less knowledgeable player. A few sessions spent in instruction can pay big dividends in participation. For students with specific difficulties in grasping and releasing objects, many games and puzzles come in oversize versions. For blind and partially sighted students it is also possible to obtain braille and/or large print versions of many of the more popular games. Check local toy/game stores or contact Parker Brothers, Salem, MA.

Structure of Activities

Good intramural programs don't just happen. Even with students who are not disabled and are knowledgeable and skilled in games and sports, some organization is necessary. With exceptional education students just as much structure and organization are needed for intramurals as for teaching any regular class--not because intramural activity is really just another class, but because the entire concept of intramurals will be new to many students. What it is, what intramural time is used for, how to

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make choices, how to get involved, how to stay involved, and how to participate successfully all need to be planned, and then those plans need to be carried out in structured, organized fashions.

Implementing Planned Program

Getting information about the intramural program to students and helping them understand information they get is a primary concern. Initially, staff needs to decide and then communicate to students some basic facts about the program, including--

- Time of day when program is scheduled. Most regular intramural programs meet either before or after school. This may also be appropriate for exceptional education students. But in some cases special education students are bussed to and from school and bus schedules do not allow for that extra time. In such cases it may be necessary to schedule intramurals during lunch periods or during morning or afternoon recess or break time. Whatever the case, days and times should be set and remain constant. A program run on a consistent schedule is much more successful than one run on a hit or miss basis. Note--If special or late bussing is provided for intramural activities involving regular education students, by law it must also be made available to exceptional education students.

- Location of the program. It will be necessary to find space available and then let students know where it is and how to get there. Large gymnasiums are nice; so are large classrooms and playgrounds. But if space is at a premium, don't forget to consider hallways, cafeterias, storerooms, and other less likely areas. It is probably better to start a program in less than perfect space--and then carefully select activities appropriate to that space--than have no program at all because ideal space is not available. Don't overlook community sites. Bowling lanes, mini-golf courses, parks, and playgrounds make great intramural sites!

- Students to be involved. Usually intramurals involve students of a single facility. However, sometimes it may be advisable to involve students from other facilities. Tournament groups are then larger, participants expand their social contacts, and more individuals have opportunities to participate. Don't discount participation by regular education students. Reverse mainstreaming--including individuals without disabilities in programs whose predominant group makeup is individuals with disabilities--can enhance a participation group by providing leadership and positive role models.

- Staff to be involved. Probably the most important criterion for selecting staff is how much each really wants to be involved. Someone who has never run an activity program can learn how if the individual wants. Intramural positions often are not paid (at least those for exceptional education students). That means willing volunteers are necessary. (Keep in mind if staff are paid for working intramurals for regular education students staff working intramurals for special education students must also be paid.) Then students need to meet this person or persons so they know who is in charge and who to look for when they come to the activity.

- Why students should come and participate in intramurals. Adults sometimes forget concepts they understand very well due to their own experiences (like the concept of intramurals) may be completely foreign to their students. Staff has to sell the program so students want to come out and try activities.

During the first few gatherings the following information should be reconfirmed, along with any general rules governing participation--

- Defining appropriate social behaviors for whatever population is participating
- Reporting procedures for accidents or injuries
- Borrowing equipment--what may be taken, by whom, when and how it should be returned
- Reporting broken equipment
- Handling edibles
- Remaining within confines of the intramural area

Exceptional education students can--and should--learn there are rules, rules for social behaviors as well as for games and sports. These students should also learn there are consequences for inappropriate behaviors. Sometimes rules are decided by adults in charge. Other times participant groups, such as an Intramural Council, make up and enforce rules. Participant involvement in governance often improves behavioral compliance. Consequences of inappropriate behavior (within the context of an intramural program) might include--

- Reminders by other students
- Exclusions from activities by other students

- Reminders by staff
- Discussions with staff
- Exclusions from activities by staff
- Discussions with school administrators
- Exclusions from activities by school administrator
- Repairs of damages
- Redresses of wrong doings
- Exclusions from intramurals

Nature and severity of offenses should determine consequences which must be consistent and fair. Any exclusions should be for specific time limits or until specific conditions are met. Most important of all, the student must understand what behavior is appropriate, and why the behavior was not (though he or she may not necessarily agree), as well as what consequences are. With exceptional education students that may mean spending quite a bit of time talking when someone gets into trouble. But kids are kids and program rules will be broken. It is up to staff to turn these situations into learning experiences so they happen as infrequently as possible.

Once basic format of program is established, participants need to learn about specific activities offered, including--

- What the activity is
- How it is played
- How to join
- When it starts
- What are the rules
- How competition works
- When it ends
- Who will be in charge

This information can be made available in a variety of ways, including--

- Verbal announcements

- Bulletin boards
- Calendar hand-outs (see section on Organization and Administration)
- Public address announcements
- Physical education teachers
- Special education teachers
- Parents

Then, follow up these formalities with person-to-person reminders. Talk to students. Make individual contacts--lots of them. Students with limited previous experiences won't know that this is fun and they can do it if someone doesn't tell them. Even seasoned veterans in intramurals need encouragement to join when new activities are introduced.

Tournament Activity

A major part of any intramural program is tournament activity. Exceptional education students can be successful competitors. Competition is not harmful to individuals who are retarded, disturbed, or learning disabled. In actuality competition is part of everyday life, and intramurals are very good places for exceptional education students to learn how to compete and handle competition. This does not mean that there is a life or death emphasis on winning. It does mean everyone is encouraged to do his or her own personal best and sometimes, if a person or person's team is better than everyone else at that particular activity, then they will win--and no one else will win!. Sometimes it is difficult for students to understand that losing is all right. For there to be a winner there has to be a loser--but losing and failure are not synonymous. Emphasis within the program should be on competition itself--

- Play fairly and demonstrate good sportsmanship
- Recognize a good play
- Have fun
- Enjoy a close game
- Work together as a team
- Do one's best
- Stay with it when things aren't going well

In tournaments, winners result. But if all competitors know they have done their best, played fairly, had a good time, and been good sports, there won't be any losers.

Type of tournament selected depends on several factors, including--

- Activity itself. Round robin tournaments are more appropriate for team sports, while elimination, draw, and ladder tournaments seem to work better for individual games and sports.
- Time available. Tournaments can last from a single day to several weeks. Large numbers of participants, less equipment, and/or less space can result in long tournaments.
- Equipment available. The more equipment available, particularly in terms of table games, the more people able to be involved and playing at the same time. To run a round robin with a large group requires a lot of equipment and space, otherwise a tournament can drag on forever.
- Space available. Team sports in particular require large areas. In some cases it might be better to run only one game at a time, leaving safety areas around boundary lines and room for spectators rather than crowding in two separate games at the same time.
- Staff available to supervise and/or officiate. Activities should be supervised; team and individual sports should be officiated. Some exceptional education students may have difficulties figuring things out for themselves when problems with rules, behavior of peers, or other unusual situations occur. This is especially true with new intramural programs, at the start of each year, and when new activities are introduced. As students become more experienced and capable of managing their own activities, they can also assume some responsibility for selecting activities, officiating, and handling equipment. But no matter how capable students become, active adult supervision should be maintained to ensure continuation of a quality program. Only schedule as many tournaments as can be actively supervised.
- Number of participants. Some tournaments lend themselves to small numbers, others accommodate large groups. If number of participants makes a tournament structure cumbersome and drawn out for too long a time period, consider dividing tournament structure into

divisions--smaller groups that play shorter tournaments with play-offs between divisions at tournament conclusion.

As noted above, tournaments can take a variety of formats.

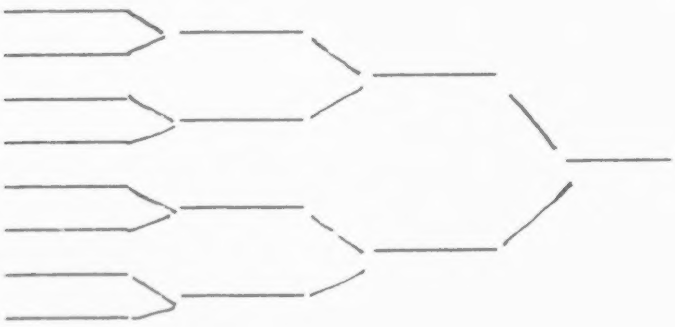
- Round Robin. In round robin tournament everyone plays everyone else an equal number of times. If there is an even number of players/teams, the number of rounds is equal to the number of players/teams minus one (N-1). If there is an uneven number of players/teams the number of rounds is equal to the number of players/teams (N). However, in setting up pairings with an uneven number of teams a bye (automatic advance but no win or loss for the opponent) is added to make the number even. In either case rotation of players/teams is counterclockwise with the first position remaining constant. A typical rotation, including a bye, for seven players/teams is--

Round 1	Round 2
bye vs. 7	bye vs. 6
1 vs. 6	7 vs. 5
2 vs. 5	1 vs. 4
3 vs. 4	2 vs. 3

  Rounds 3 through 7 continue the established rotation until each player/team has played all other players/teams.

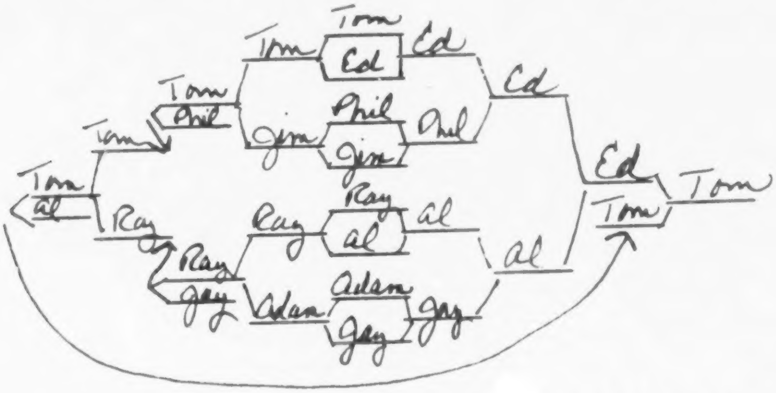
- Multiple Division. If there is a large number of teams in a round robin tournament, the group can be broken into two or more divisions. Each division becomes a tournament in itself. Winners or each division play off for the championship at the conclusion of the tournament.

- Single Elimination. In an elimination tournament those who win continue to play, those who lose may enter a separate consolation tournament or are out. Elimination tournaments are organized on multiples of 8 players and are laid out on a graph such as this--



If there are not eight players/teams (or enough to make multiples of four) a bye (automatic advance for opponent) is added in place of a player/team until there is a number divisable by four. (Power of 2 is the basis for increase, i.e., 2, 4, 8, 16 team tournaments.) When adding byes, be sure to put them at opposite ends of the graph and only in the first round. A bye cannot play a bye. The best teams/individuals usually receive the bye.

- Double Elimination. A double elimination tournament is a variation of the single elimination tournament. Now a player is allowed two losses before elimination. Winners move to the right on the graph, losers to the left. Note the arrows showing how losers in the second and third rounds move to left before being eliminated.



When a bye is used (only in the first round and then never paired with another bye) the player/team paired with the bye moves to the right. The bye is moved to the left. In the last game of the tournament if the player that had been advancing on the right (winning) side does not win, a second game is played (because each player has two losses before being out).

- Draw. Draw tournaments are also good ways of working with large numbers of people. A separate three by five inch card or small piece of paper is made out for each person containing the following information--

Name________________________

Wins________________________

Losses______________________

Place_______________________

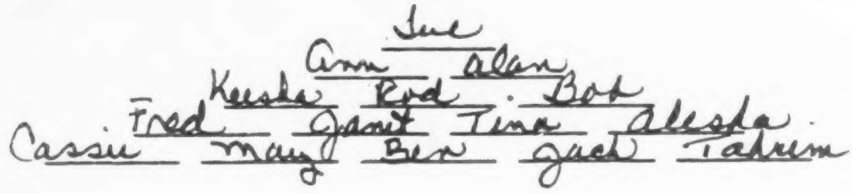
These cards are all thoroughly shuffled and at the start of each day's competition, opponents are drawn. After they play, results are entered and cards of those who have played kept separate until everyone has played one game. Then all cards are mixed again and round two is drawn. When everyone has played about half the games planned for the tournament the entire group can be separated in half based on won-lost records. That way the second half of the tournament results in more equal play as those with more wins will be playing against equally successful players. At the conclusion of the tournament the top four to six players from the entire group can play off in a shorter tournament (may be any tournament type) for top honors. This type of tournament gives everyone equal opportunity to play but does not take the time other tournaments would with a large group. Plus there is a special excitement to a random draw of competitors that provides added interest.

- Ladder. A ladder tournament is designed by placing everyone on steps of the ladder (or list).

  1.
  2.
  3.
  4.
  5.
  6.
  7.
  8.
  9.
  10.

  Players progress to the top (number 1) by successfully competing with players directly above them. Games can be scheduled or players can set up their own games by challenging those above them. To give everyone an opportunity to play, it is usually wise to limit challenges to one or two levels higher. Only one challenge may be given at a time. Winners then earn their ways to the top and those who lose do not drop so far down that they get discouraged. After a game, the winner is placed on the higher rung of the ladder. Be sure to provide structure for how the challenges are issued.

- Pyramid. Similar to a ladder tournament, participants challenge up. However, there may be several participants on each level. The lowest level has the most people, tapering to a single person at the top of the pyramid. Players advance to top of pyramid by challenging players on the level directly above theirs. Winners remain on the higher level. For example--



- Self-improvement. In a self-improvement tournament participants compete against themselves rather than each other. At the start of the tournament a base score is determined on a particular task, e.g., shooting free throws or time over an obstacle course. Then participants get a stated number of trials over a period of two to three weeks to better their scores. The winner is the person who improves the greatest percent over original score.

- Mystery Finish. In this tournament or race the end point is kept a secret. All competitors participate in the activity, keeping track of how many laps they run, points they accumulate, or tasks they complete. At the conclusion of the tournament, the end point is announced and the participant coming closest is the winner. For example if the activity is to walk a mile in laps around the gym participants are told to walk the mile but are not told how many laps equal a mile. Their task is to guess and then perform the task. The person who does the number of laps closest to equaling a mile is the winner.

- Specialty. Sometimes a game or sport lends itself particularly well to a specialty tournament. Monopoly is such a game. Four players to a game board and three or four boards in action at one time can become a millionaire tournament, winner being the person in the entire group who has the most money or reaches a certain financial level at the end of a specified time period (hours or days!). Specialty tournaments add novelty to a program and creative program directors will have one or two specialty tournaments each year to add variety to activities.

- Deck of Cards. As participants complete specific tasks (laps of a run, for example) they are given playing cards, randomly dealt off a deck. At completion of the activity the winner is the person with a particular winning hand of cards or the best poker hand.

- One Day. One day tournaments can take any format. They differ from traditional tournaments because they start and end on the same day. Great for special events, holidays, parties, and a break in the routine, their short duration makes them fun to enter and easy to complete.

No matter what the tournament selected it is important to --

- Be sure participants understand how it works--a visual representation helps.
- Provide opportunities for learning and practice before the tournament begins.
- Set definite limits for start and finish.
- Provide for supervision and/or officiating.
- Post standings and/or results as tournament progresses.
- Announce results to entire group at conclusion of tournament.
- Praise all who participate, both during and after tournament.
- Evaluate activity in terms of specific goals for total program (refer to section on Organization and Administration).

Tournaments can be very confusing, particularly to individuals with difficulty in abstract thinking. Sometimes the only way to learn and understand a tournament is to go through it game by game, learning as it progresses. Remember, sometimes experience is the best teacher, and exceptional education students need all the experiences they can get!

Open Gym

Another form of intramural activity is open gym. Not all intramural activity should be tournament oriented. Students also need time to participate free from stress and excitement of competition. It may be they want to practice skills. Some individuals might want to try a new activity, while others may want to spend time doing an old favorite. At the start of the school year it seems all basketball lovers have to make sure they still can put it through the hoop! There may be days that some people want just to sit and watch, and that's all right. A big part of the intramural concept is the idea of free choice, and open gym means allowing participants to make these choices.

Ability to make choices, and as a result participate successfully during open gym, doesn't just happen. Students need to learn how to participate in open gym just as they had to learn to participate in tournaments. Open gym is not complete freedom. There should be--

- Clearly defined areas of space for each activity available. Obviously basketball is played on a court, but how much space is needed for a game of catch or for tetherball? Labeling areas with signs (pictorial or print) and/or colored tape on the floor helps.
- A specific list of activities permitted. It is very difficult to play tag or chase games as a part of indoor open gym. Random throwing of balls at people is obviously not allowed.
- A policy on how much equipment will be made available and how students can get and return it.
- Rules of conduct, which are enforced.
- Means of fairly resolving disputes over who will use what equipment and how much space should a conflict arise.
- Supervision at all times.

Some students have had so few experiences that they will be totally lost during open gym times. It may be necessary for staff initially to structure its time for them. This can be done by asking another student to buddy up and include the individual in an already existing activity, teach or practice a game, or just stay to get acquainted. It is usually preferable to have student-to-student help rather than staff-to-student help. If an individual does need assistance, remember that intramurals are a peer group activity, and involving a student's peer group in the helping process benefits everyone.

Organization and Administration

Programming possibilities are almost endless. Therefore, to provide a quality program some decision making and organization must take place before activity begins. One goal of intramurals is involving everyone in the program. Activities aren't just for highly skilled. They are for everybody, skilled or not, experienced or inexperienced. This means activities should be selected based on interests and abilities of the entire group. Variety is important, both in type of activity as well as format (e.g., tournament, open gym). It also means there needs to be a conscious effort to recruit participants, not only for the program itself but also for each and every event. All students will not participate in all events, but they should be encouraged to do so if they want. No one should be excluded by the peer group or by structure of the program. Remember, too, is may be desirable to invite regular education students to join the intramural program. Reverse mainstreaming can be beneficial to all, particularily when new activities are being learned, larger number of participants needed, and/or social groups are becoming restrictive.

A second goal of participation in intramurals is enjoyment. It should be FUN! But what is fun for one person is not always fun for another. Strive for fair competition in tournaments, emphasizing each individual doing personal best (rather than emphasizing winning). Again a wide variety of activities is needed with opportunities to apply skills already mastered as well as to learn new games and sports. Even learning how to deal with losing can make a not so successful experience an enjoyable one. Not everyone will enjoy participating.

With goals of maximum participation and enjoyment of activity in mind, a general schedule of events should be drawn up listing on a month-to-month basis everything that might be offered for the entire year. For example --

September -- soccer
checkers
tetherball

October -- flag football
bingo
Halloween Ghost Bowling

Tournaments may overlap month-to-month but general planning of the entire year helps keep things moving.

Prior to start of each month a more detailed calendar should be written with days for specific activities. Length of tournaments should be set as well as starting and ending dates. This is determined mostly by number of persons participating; however, tournaments lasting longer than a month or extending over vacation periods tend to get cumbersome and participants lose interest. One day tournaments can be especially enjoyable as part of a holiday or special event celebration. This calendar can be posted on the bulletin board and/or duplicated and given to students and teachers. Even if students cannot read, it can be read to them and it is theirs to show family and friends what exciting special programs they are involved in at school.

The sample calendar shown is for an intramural program that meets daily for a half hour. It serves approximately eighty students, though not everyone is involved in every activity. When reading the calendar note that scooter soccer is already under-way and teams that play are listed. The bean bag tournament starts with practice sessions and then goes into match play; however it is a challenge ladder tournament and participants have to consult a separate display board to see who plays. Flag football also

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S	M	T	W	T	F	S
	1 SCOOTER SOCCER 3 VS. 4	2	3 SCOOTER SOCCER 1 VS. 2	4	5 SCOOTER SOCCER 1 VS. 4	6
7	8 SCOOTER SOCCER 2 VS. 3	9 SIGN-UP FOR BEAN BAG TOURNAMENT	10 SCOOTER SOCCER PLAY-OFFS	11 BEAN BAG TOURNAMENT PRACTICE	12 FLAG FOOTBALL MINI-CLINIC	13
14	15 FLAG FOOTBALL MINI-CLINIC	16 BEAN BAG TOURNAMENT PRACTICE	17 FLAG FOOTBALL MINI-CLINIC	18 START BEAN BAG TOURNAMENT	19 FLAG FOOTBALL TEAM SELECTION	20
21	22 FLAG FOOTBALL TOURNAMENT	23 BEAN BAG TOURNAMENT	24 FLAG FOOTBALL TOURNAMENT	25 NO SCHOOL TEACHERS CONVENTION	26 NO SCHOOL TEACHERS CONVENTION	27
28	29 FLAG FOOTBALL TOURNAMENT	30 BEAN BAG TOURNAMENT	31 HALLOWEEN PARTY BIG BOO!!!!!			

SMITH SCHOOL INTRAMURALS

starts with practice sessions before going into the tournament. Soccer and flag football require a large indoor area so on those days students not in that specific activity may watch or participate in table games or bean bags (non-tournament) in the smaller activity area. On days of the bean bag tournament the large activity area is available as open gym. Notice also that tournament scheduling is spaced so that students can participate in several tournaments at one time if they wish.

If several different activities are going on at one time it may also be necessary to post daily schedules. Exceptional education students often need help in managing their time and remembering commitments. Making an announcement at start of each intramural period regarding that day's schedule enhances everyone's participation and enjoyment.

In spite of desire to include everyone in intramural activities there are times when that may not be feasible. Number of students included may be limited by equipment and/or space available as well as by staff availability. Safety must be a prime concern and the group should be only as large as can safely participate.

No mention has been made of award systems. That doesn't mean that awards aren't important. It just means they aren't the central focus of the program. Obviously awarding trophies comes to mind first and that is one possibility. However, if the program is an extensive one, a trophy for each tournament can be very costly. One solution is to have tournament trophies remain in school, with each year's winners added to the trophy plaque. Sometimes trophies can be donated. Only name plates then have to be changed.

Ribbons are an alternative. They are less expensive and can be given for as many places as one wishes. Ribbons can be imprinted for each different sport and/or can be designed with name of school or program on them. Ribbons can also be handmade using supplies from a local fabric shop.

Patches are somewhat more expensive but can be designed to reflect the particular program for which they are given. Asking participants to design award patches heightens interest. Patches are easier to give if participation in all activities is on a point system with awards being given only once or twice a year. Participants can then accumulate points and even the least skilled participants can receive top awards by accumulating participation points.

Perhaps the least expensive type of award is a certificate. There are several computer programs available (Springboard, 1986; Baudville, 1988), making certificate design easy for even the novice computer user. Fill-in-the-blank type certificates that can be printed in large numbers can be used for a variety of activities. Gold/silver seals and/or cut ribbon can be used to trim certificates for repeat winners.

What awards are given for which activities should be clearly stated before activities begin and everyone should be aware of what they can work toward. Awards can be given at the conclusion of each activity or tournament or participants can accumulate points for participation and for doing well, and these points can be accumulated toward awards given once or twice a year.

Each program staff needs to make decisions on awards and award systems based on their own students' needs. There doesn't have to be any award system at all! Sometimes announcement of tournament winners, over the PA system or on a bulletin board (maybe with a picture), is for the exceptional education student (who probably hasn't received a whole lot of awards in the past) an extremely gratifying experience.

Conclusion

Exceptional education students are often left out of regular intramural programs. But that does not mean they should be denied the intramural experience. Intramurals can be organized within a classroom group or educational unit as well as within an entire facility. Participants do not need to be highly skilled or extremely knowledgeable, but they do need to want to have a good time. The key is staff--people who can organize the program and then become actively involved in recruiting participants, teaching skills, designing tournaments, officiating, supervising, mediating disputes, and dispensing band-aids as well as pats on the back. They are public relations experts in disguise who just happen to care a great deal about providing important experiences--intramural experiences--to persons with very special needs.

Resources

Award Maker. (1988). Grand Rapids, MI: Baudville.
Certificate Maker. (1986). Minneapolis, MN: Springboard Software.
Fluegelman, A., ed. (1976). The new games book. Garden City NY: Dolphin.
Fluegelman, A., ed. (1981). More new games! Garden City, NY: Dolphin.
Morris, G.S.D. and Stiehl, J. (1989). Changing kids' games. Champaign, IL: Leisure Press.
National Association for Sport and Physical Education (1986). Intramurals and club sports. Reston, VA: American Alliance for Health, Physical Education, Recreation and Dance.
Orlick, T. (1978). The cooperative sports & games book. New York: Pantheon.

PRACTICAL POINTERS

SAFETY AND INJURY PREVENTION FOR PERSONS WITH DISABILITIES

Thomas J. Birk

GENERAL CONSIDERATIONS

Preventing injuries during exercise and sports participation is paramount to physically benefiting and emotionally enjoying activity. There are several general considerations which every educator and participant with a physical impairment should be aware of:

* Equipment
* Staying within physical capability
* Staying within patterns of movement during instruction
* Intensity
* Warm-up preceding and cool-down following activity

Equipment

All equipment used for sports and exercise purposes should have an ample base of support so it does not tip over when being used. Equipment should also have no sharp edges or corners which could be easily bumped into. Transferring from a wheelchair to equipment for sports or exercise participation should also be relatively simple. Consequently, equipment should not have an excessive support structure which might hinder a student with balance or gait problems.

Staying within Physical Capability

Sports and exercise participation should be encouraged but yet every participant should stay within their physical capabilities. Going beyond normal range of motion or strength of a participant with a physical impairment, especially impairment of a limb, could result in injury. For instance, static stretching, rather than ballistic stretching, should be done for increases in muscle elasticity. Ballistic stretching or fast, jerky, moving type stretch of the muscle done by a person with a physical disability which limits range could invoke a stretch reflex and perhaps contracture. If muscular strength increases are important, overloading a muscle group should be medically approved before the particular exercise or sport movement is done. This will eliminate possible muscle spasm and contracture problems which could result.

Staying within Patterns of Movement During Instruction

Skills instruction in sports or exercise activities should stay within basic patterns of movement. Single plane movement should be encouraged, at least at the beginning of new instruction for a particular skill. For instance, movements which incorporate a twisting or turning (transverse plane) and simultaneous sideways (frontal plane) movement will only tend to confuse and make movements more uncoordinated for a novice. Initially, this could result in injury.

Intensity

The intensity of exercise or activity should generally be moderate. That is, the pulse rate, which is the single best indicator of intensity (if you have someone to take this occasionally), should be 140-160 beats per minute for a middle to secondary school student. Intensity also can be measured by a perceived exertion rating (RPE) (see scale). This is an undifferentiated (not focusing on one part of the body) rating of integrated sensations of effort from arms, legs, warmth of the body, breathing depth and rate, etc. It is based on a scale developed by Borg, which, incidently, has a one-tenth relationship to heart rate, at least for adults.

THE 15-GRADE SCALE FOR RATINGS OF PERCEIVED EXERTION (RPE)
(Adapted from Borg, 1970)

6	
7	Very, very light
8	
9	Very light
10	
11	Fairly light
12	
13	Somewhat hard
14	
15	Hard
16	
17	Very hard
18	
19	Very, very hard
20	

A proper intensity rating from the Borg scale for a middle or secondary school student should be 12 or 13 to correspond to this moderate intensity level.

Warm-up/Cool-Down

Prior to beginning any sport or exercise activity, a 5-10 minute warm-up should be completed. Warm-up should include initially slow to moderate whole body movements or as many muscle groups moving at the same time as possible. Increasing heart rate is the primary goal during this initial warm-up period. The second portion of the 5-10 minute warm-up should include stretching for muscle groups that will be involved in the activity. This stretching should be static in nature and be 15-30 seconds in duration for the particular muscle groups that will be active.

Static stretching safely prepares the muscles, tendons, and ligaments for exercise. This should be part of every warm-up and cool-down portion of exercise and activity sessions. During warm-up this type of stretching places gradual tension demands on muscles, tendons, and ligaments similar to the upcoming exercise or activity. During the warm-up portion it is important to remember that stretching should follow movements that increase muscle temperature and heart rate.

During cool-down, static stretching helps prevent muscle stiffness and soreness. This permits muscles to feel relaxed, rather than tight and helps maintain and possibly increase flexibility. Preceding stretching during cool-down should be a gradual slow-down of activity for the whole body. This will help avoid blood pooling in the lower extremities if legs are active during exercise.

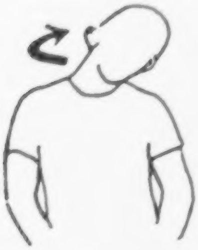
The ten static stretching exercises shown on the next page should be done during warm-up and cool-down portions of exercise and activity sessions. Relative to a specific impairment some of these stretches may be difficult or impossible to do.

In the subsequent specific impairment sections of this POINTER, recommendations for particular stretches are made. Each static stretch is numbered so it can be located when recommended relative to a specific disability or impairment.

It is important to remember that during warm-up the static stretch should be done for at least 15-30 seconds. During cool-down portions of the exercise activity, the stretch should be held for 30-60 seconds. When stretching--

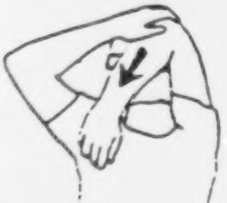
- Stretch the portion of the body pictured to a point where the stretch can be felt without pain.

1. NECK STRETCH



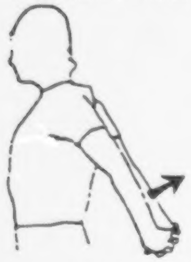
Each side of the neck should be static stretched.

2. SIDE OF SHOULDER AND UPPER ARM STRETCH



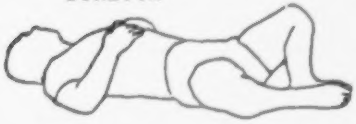
Do both arms.

3. CHEST AND FRONT OF SHOULDER STRETCH



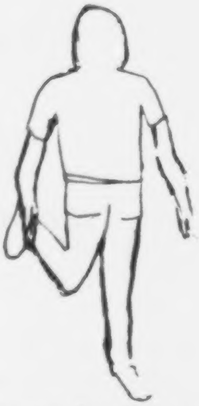
Important to keep body upright while hands are behind body.

4. INSIDE OF UPPER LEG STRETCH



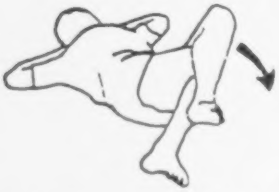
Important to let knees down slowly.

5. FRONT OF UPPER LEG STRETCH



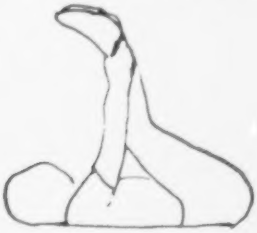
This can be done standing or lying on one's side. Do both legs.

6. OUTSIDE OF UPPER LEG STRETCH



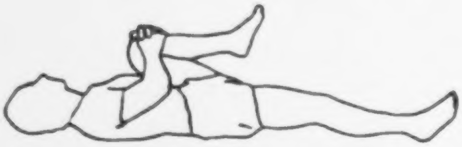
Important to bend leg being stretched at the knee.

7. BACK OF UPPER LEG STRETCH



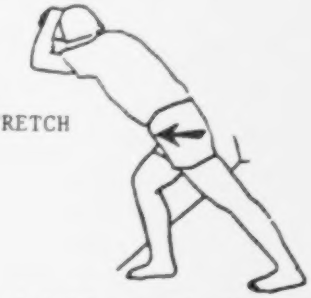
Can alter position of hand to where it is just above or slightly below the knee using only one leg at a time if preferred.

8. LOWER BACK STRETCH



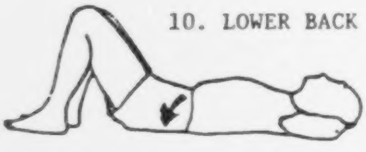
This can be done with both legs bent, with the knees at the chest and the hands underneath the knees as an alternative.

9. BACK OF LOWER LEG STRETCH



Important to let hips gradually sag into the wall while keeping the heel flat on the floor. Do both legs.

10. LOWER BACK STRETCH



Important to flatten lower back while contracting abdominal muscles (push back into floor).

- Don't bounce, jerk, or strain.
- Continue breathing.
- Stretch only the area designated.

SUMMARY

- All equipment used should have a wide base of support and not have any sharp edges or corners.
- Participants should stay within physical capabilities as defined by disease, diagnosis, and personal physician.
- Skill instruction should initially be within single plane movement, or movement in one direction.
- Warm up (5-10 minutes) by gradually increasing tempo of movement and concluding with some brief static stretching of major muscle groups to be involved in forthcoming activity.
- Intensity should be at a generally moderate level.
- Do static stretching during warm-up and cool-down.

POINTERS FOR SPECIFIC IMPAIRMENTS

Some physical impairments require more specific guidelines for preventing injury. This section addresses etiology, activity suggestions, intensity and duration amounts, warm-up, cool-down, and environment during sport and exercise activity for individuals with

- muscular dystrophy
- epilepsy
- diabetes
- cerebral palsy
- spina bifida

Muscular Dystrophy

Etiology

The two types of muscular dystrophy common to children are pseudohypertrophic and facioscapulohumeral. For middle school and secondary students the second most common (facioscapulohumeral) is most prevalent. As the name implies this form affects shoulder and upper arms and consequently raising arms above the head can be difficult. This is a milder form than pseudohypertrophic (Duchenne) and progresses more slowly. Consequently, the safety and injury prevention indications relative to the pseudohypertrophic type are not as stringent. However, there is variance among students with this disease.

There are three common physical characteristics--

- tendency to fatigue more quickly
- tendency to lose fine manual dexterity and control
- weakness in middle body area (abdomen, pelvic, hip) tending to produce adverse postural changes

Activity Suggestions

Since fine motor skills are usually lacking and there is a tendency to fatigue more quickly, as many large muscle groups as possible should be involved in each activity. Activities involving large balls requiring pushing with arms and using entire upper body while standing or sitting (depending upon ambulatory status) would be an example of an exercise activity which would maintain strength and yet be fun.

Some exercise activities incorporating as many muscles as possible include stationary bicycling, using all four limbs if possible, rowing, and water activities. Intensity and duration need to be considered when performing a group activity, such as rolling or kicking around a large ball or rowing or riding an arm and leg cycle.

Intensity and Duration

Intensity should be 140-160 bpm for pulse rate and 12-13 RPE. Initially, students should exercise for up to 3 minutes at the above mentioned intensities. These 3-minute intervals should be repeated up to 5 times during the first 2-3 weeks at the beginning of the school situation. A short break (up to 2 minutes) between intervals allows for the heart to "catch up" to send enough blood to deconditioned and fatigued muscles. The short interval (3 minutes) is to avoid ischemia or lack of oxygen and blood flow to a fatigued, diseased muscle. This approach will help maintain strength and also produce endurance or aerobic fitness. Under the direction of the individual's personal physician, a sports and exercise program should concentrate on minimizing further loss of muscle strength.

Progression should include simply increasing the amount of time to each interval. A goal for a middle or secondary school student would be perhaps five intervals of 5 minutes per session of class.

Intensity does not need to progress if it is within the heart rate and RPE ranges indicated.

Warm-up

Prior to doing any of these activities a warm-up period is indicated. However, usually due to the low fitness of students with this disease, a warm-up period does not need to be lengthy in order to increase pulse rate. Three to four minutes would be ample time to increase blood flow around the body. Warm-up activities should simply be similar to the type of activity students will be involved in only somewhat slower for the 3-4 minute period. After general calisthenic movements similar to the type of activity to be done, do the following static stretches--

- If in a wheelchair, do #1, 2, 3 and possibly #4.
- If ambulatory, do all 10, especially #1-9.

Cool-down

Cool-down activities should include 1-2 minutes of slow moving activities, similar to what was done during class. Following cool-down activities, do the same static stretches done during warm-up only for a longer period of time (30-60 seconds).

Environment

Sport and exercise activities for students with muscular dystrophy should be conducted in a moderate to cool environment if possible. This will avoid sudden onset of fatigue which warm weather elicits. However, caution should be used in not making the environment too cool, which could cause dampness and perhaps make students more susceptible to respiratory infections. Persons with muscular dystrophy more than likely will have experienced progressive weakness and muscle deterioration not only in skeletal muscle but possibly in respiratory muscles. Consequently, if contracted, a respiratory infection could further weaken respiratory muscles.

SUMMARY

- Maintain muscle strength by involving large muscle groups in each activity.

- Warm-up time should only be 3-4 minutes prior to activity and consist of gradually increased tempo of movement of large muscle groups.

- Intensity of activities should be moderate, pulse rate 140-160 beats or 12-13 on the Borg Scale.

* Duration should be in 3-minute intervals repeated 5 times during a typical activity session.

* The break in between intervals should last up to 2 minutes.

* Progression should involve increasing the duration of each interval.

* Temperature should be moderate during activity.

* Cool-down should be 1-2 minutes of slower moving, large muscle activities followed by 30-60 seconds of static stretching.

Epilepsy

Etiology

Although there are six different classifications of seizures relevant to epilepsy the two most common are petit mal and grand mal seizures. The grand mal is potentially the most dangerous since there is usually loss of consciousness and falling. The petit mal is usually characterized by frequent periods of consciousness impairment, manifested with rhythmic blinking of the eyes or occasional arm jerking. Physically, the individual is usually in control of bodily movements and thus there is little danger of falling and possible injury.

Activity Suggestions

Participation in sports and exercise activities should be encouraged. Seizure frequency has some association with lack of fitness. Consequently, a person who is not participating in physically active activities will become less fit and more prone to fatigue when doing any activity. Paradoxically, an increased intensity of activity makes one more fatigued but on the other hand, the increased acidity of the blood with increased intensity of activity lessens the frequency of seizure.

A short break between the intervals will keep enough acidity in the blood, thus helping to prevent possible seizure occurrence. The break between intervals should consist of some active but lesser activity or movement. The frequency of activity should be at least 3 times/week.

Intensity and Duration

A more than moderate intensity, whether it be of a sport activity or individual exercise, should be properly planned. Pulse rates at this moderate plus level will be, for most middle to secondary school students, around 160 bpm. This would be at least a 13 on the RPE scale. A duration of only 20 minutes in total for the first few weeks for a student who has not been very active will not overly fatigue the student. The 20 minutes should be divided up into approximately 4-5 minute intervals with a short break in between each interval. These intervals will allow intensity to be greater than moderate but not overly fatigue the student. Intervals should be done at least for the first several months with gradually less rest between intervals until the student can go at a moderate plus level intensity for close to 30 continuous minutes of activity. Proper progression of activity should include up to 30 minutes, 3 days per week, of activity with intensities at a moderate plus level.

Warm-up

A 5-7 minute warm-up period consisting of whole body activity, moving as many muscles as possible is warranted. After the extended warm-up period utilizing calisthenic motions similar to the activity to be done, the following static stretches should be performed:

* #2, 3, 5, 6, 7, 8, 9.

Cool-down

Cool-down, which is a crucial period of class, should be 3-4 minutes in length. If a cool-down is too rapid, it will result in sudden blood pressure drops which could cause a sudden relaxation and make the student more susceptible to seizure. The cool-down should be at a light to moderate level for the first couple minutes proceeding to a light to slow walking type level for the last minute or so. Perform the same static stretching exercises done during the warm-up but only for 30-60 seconds.

Environment

Another concern for a student with epilepsy is temperature and humidity conditions during activity. Hot humid weather, of course, brings on fatigue much sooner. This fatigue could trigger a seizure much more readily than usual. Consequently, try to exercise in a cooler, less humid environment. If the student has to be outside exercising the temperature should not be above 80 degrees and the humidity not above 50%.

Equipment

Since children with grand mal seizure possibilities have greater susceptibility to injury after losing consciousness, equipment should be softer and arranged properly. If possible sports and exercise equipment should be on the ground and be made of plastic or a nonmetal substance. The equipment should be arranged in a manner which is not clustered together in the event the student needs a place to fall.

SUMMARY

- Avoid hard or steel equipment.
- Do not cluster equipment, leave ample room between different pieces of apparatus.
- Seizure frequency is associated with fatigue and lack of fitness.
- Warm up for 5 to 7 minutes, using whole body and large muscle group activities and exercises.
- Intensity should be moderate plus or around 160 beats/minute pulse rate (13 on the RPE scale).
- Duration should be initially 20 minutes, divided into 4-5-minute intervals with only a short break (one minute at most) between each interval.
- Progress to 30 continuous minutes of activity over the first one or two months.
- Cool-down should be 3-4 minutes consisting of slower moving large muscle group activities.
- Include static stretching of major muscle groups as part of cool-down.
- Exercise and sport activities should be in a cool, less humid environment (ideally not above 80 degrees and not above 50% humidity).

Cerebral Palsy

Etiology

Generally there are three types of cerebral palsy--

- spastic
- athetotic
- ataxic

Some children have mixtures of all three.

Strength and endurance shown in motor skills of individuals with cerebral palsy are usually limited. In fact, endurance is usually

10-30% lower in adolescents with cerebral palsy than able-bodied children. Lack of synchronized, coordinated movements is responsible for low mechanical efficiency, which in turn leads to diminished strength and endurance.

Activity Suggestions

Sports and exercise activities for mildly to moderately affected students should include those using as many muscles as possible. This will help increase aerobic capacity and overall endurance. Such activities should include--

- walking-jogging
- exercising with large balls
- using pulleys
- pedalling or arm cranking on a cycle ergometer
- riding a tricycle
- wheelchair sprinting and slalom
- water activities.

More severely affected can be involved in--

- mat activities
- water activities
- crawling motions
- pedalling or arm cranking on a cycle ergometer in a supine or prone position.

It is best to change activities frequently for students with cerebral palsy. This is because of a short concentration span prevalent in some individuals with cerebral palsy. Changing frequently also keeps activities fun and enjoyable. Initially, duration of the sessions should not be more than 20 minutes. Again as with individuals having other physical impairments, an interval approach should be used. This keeps emphasis on changing activities as well as making activities fun.

Relaxation activities should also be included during at least one or two sessions a week. This might be simply teaching a "head to toe" relaxation procedure entailing relaxing one muscle group at a time from fingers down to toes. Initially, take seven or eight minutes for "getting used to" purposes. Then, plan this type of relaxation for five minutes per class. Preferably a darker room, free of noise, is advocated for total relaxation after activity sessions.

Sport and exercise participation in strength activities requiring muscle contraction 100% of maximum levels is permissible for certain students with cerebral palsy. At one time, this type of heavy resistance or lifting exercise was thought to increase spasticity. However, some studies have suggested that just the opposite occurs. This may be secondary to increased blood flow after exercise, which in turn could decrease spasticity. Spastic muscles usually receive subnormal blood flow before and during exercise.

More intense activities requiring greater heart rate response after exercise appear to increase blood flow through increased dilation of the capillary bed of the muscles. Thus, movements and even movements with resistance and weight may be beneficial rather than contraindicative for students with cerebral palsy.

Intensity and Duration

Intensity should be up to a moderate plus level. Heart rate or pulse rate can equal anywhere from 160-180 beats/minute for a middle to secondary school student and RPE should be 12-14. No more than two sessions per week with more intense activity is recommended. At least one session during the week should have an RPE less than 10 and a duration up to 60 or more minutes. This would definitely lend itself to a slower activity, one which is obviously not competitive. Intensity in this case would be 11 or lower on the RPE schedule and heart rate less than 150 bpm.

Warm-up

Warm-up prior to sports and exercise participation should include mild to moderate activity and more intense gradation over an 8-minute period. This will enable gradual dilation of capillary beds, increasing blood flow to muscles and perhaps diminishing spasticity somewhat.

Unlike individuals with other physical disabilities, students with cerebral palsy respond better to heat. A warmer environment naturally increases blood flow to muscles which are receiving subnormal amounts during rest. The following static stretching exercises should be attempted--

- #2, 3, 4, 6, 7, 8, 9.

Assistance may be needed on performing and holding stretches. It is important to avoid ballistic or sharp movements of limbs to stretch muscles. Stretches must be very static, will be self-limiting and safer for this type of neuromuscular impairment.

Cool-down

Stretching done after exercise is best done with a less spastic partner or the instructor. Some students with cerebral palsy have difficulty isolating muscle groups while stretching. Working with a less spastic partner will enable students who need static stretching for up to 60 seconds per muscle group a better controlled stretch. The cool-down should include mild intensity movements similar to those done during the sport and exercise session. Duration is approximately two minutes. Perform the same static stretching exercises which were done during warm-up and attempt to hold the stretch for at least 60 seconds per muscle group.

Environment

Temperatures above 75-80 degrees, as long as humidity doesn't get above 60, are better than a colder environment, which could invoke spastic responses.

Equipment

Equipment considerations for students with cerebral palsy should primarily center on equipment with a stable base and requiring shortened range of motion movements. Equipment should have a base of support which is not prone to instability. Unstable equipment could precipitate a fall which would be difficult to control for someone with cerebral palsy. Also, a piece of exercise equipment should not go beyond the normal ranges of motion of the particular student. Thus, excessive motion for a piece of equipment, going beyond the range of motion of a particular limb, should be avoided.

SUMMARY

* Strength and endurance are usually limited (10-30% lower than able-bodied).

* For mildly affected students, include activities which are rhythmic and repetitious in nature.

* More severely affected students can do mat and water activities.

* Change activities frequently during the course of a 20-30-minute session.

* Intensity should be at a moderate plus level, with pulse rates of 160-180 bpm and an RPE of 12-14 for two sessions/week.

* Plan one session of 60 or more minutes with intensity of 150 bpm pulse rate or 11 on the RPE scale.

* Include relaxation activities for at least 1-2 sessions/week

- Duration should be in intervals for the initial 20 minute sessions (4-5-minute intervals).
- Exercises and movements which require lifting or pushing resistance or weight are not contraindicated for mildly to moderately affected students.
- Warm-up should be over an 8 minute period encouraging use of large muscle groups at a slow to moderate tempo.
- Static stretching should be used during warm-up for 15-30 seconds and during cool-down for up to 60 seconds stretching the major muscle groups used in the activity.
- Equipment should have a broad base of support to prevent falls.

Diabetes

Etiology

Diabetes is characterized by lack of insulin production by the pancreas. Too little production results in glucose or sugar not being deposited in muscle cells or in the liver for energy storage purposes. Consequently, the glucose can increase in the blood stream to potentially harmful levels. Diabetic coma and hypoglycemia are some of the results of having a blood sugar level that is either too high or too low. In either case the person is subjected to physical fatigue and mental confusion. Insulin dependent diabetes, as in juvenile diabetes or diabetes striking at an early age, is characterized by daily insulin shots. These insulin injections permit glucose to be more efficiently stored in muscle cells and in the liver and prevent some of the problems which occur when blood sugar is too high.

Activity Suggestions

Sport and exercise participation is highly advocated for children with diabetes since an exercising muscle demands more energy, hence more glucose or sugar. This reduces the level of blood sugar and consequently helps to prevent elevated blood sugar. One of the positive effects of continual use of sport and exercise participation for a juvenile diabetic is a possible gradual reduction in the amount of insulin required due to an increased sensitivity of muscles and liver to use glucose.

Some sports and exercise activities involving large muscle groups which can be done at least at a moderate intensity include:

- basketball
- soccer

- * tennis
- * ice hockey
- * cross-country skiing
- * figure skating
- * snow shoeing
- * cycling
- * walking/running
- * swimming

Intensity and Duration

Intensity of activity should be moderate for a middle or secondary school student with diabetes. This would put heart rate or pulse rate ranges within the 140-160 bpm range and would mean approximately 12-13 on the RPE scale. Duration should be at least 5 minutes/interval for lower fit individuals at the intensities mentioned and for average fit students up to 30 continuous minutes. Frequency should be every day to help control blood sugar.

Warm-up

Warm-up activities should include up to 5 minutes of mild to moderate intense movements which will be used for the sport and exercise session. The following static stretching exercises should be done after the calisthenic movements pertinent to the specific sport or exercise are completed--

- * #1-10

Cool-down

Cool-down should include some mild or slow movement for up to 2 minutes after sport and exercise has been completed. The following static stretching exercises should follow the 2 minutes of mild and slow movements--

- * #4, 5, 6, 8, 9

Environment

Environment for sport and exercise should be a moderate climate with temperatures up to 85 degrees and 60% humidity. A heated environment results in more glucose being expended for a given workload. Consequently, a hotter environment may help to lower blood sugar even more. However, this must be tempered to avoid too sudden a drop in blood sugar and a resultant hypoglycemic state.

Equipment

Equipment concerns regarding team and individual activities are not significant. A person with diabetes does not have any nerve or muscle problems which require equipment modifications for safety purposes.

Safety Considerations

Two safety concerns must be considered at this point.

Time and calculate the insulin injections with sport and exercise activity during the day. An insulin injection should not immediately precede exercise. A combination of insulin injection and exercise could drastically lower the blood level to a hypoglycemic state and possibly cause a semi-conscious state.

Keep a high sugar concentrate on hand during exercise sessions. This high sugar concentrate could be anything from a Coke to monogel. Orange or apple juice is preferred by many individuals with diabetes after exercise if symptoms result.

The primary symptoms to be aware of during and after exercise include--

* pallor
* confusion
* lack of steady gait
* a fixating stare
* lack of coordination

SUMMARY

* Students may be fatigued and mentally confused if blood sugar is not controlled.

* Sport and exercise participation reduce the level of blood sugar, and thus is very beneficial.

* Intensity of activity should be moderate, with pulse rates of 140-160 bpm and RPE around 12-13.

* Duration should be 5-minute intervals for up to 30 minutes of activity.

* Goal is 30 continuous minutes of activity

* Frequency should ideally be every day.

* Involve large muscle groups when planning activity.

- Keep a high sugar concentrate on hand.
- Preferably, sport and exercise participation should be in a moderately heated environment (up to 85 degrees and 60% humidity).
- Warm-up activities should include 5 minutes of mild to moderate whole body movement.
- Cool-down should include up to 2 minutes of milder, slower movement, followed by static stretching of the major muscle groups used for up to 60 seconds.

Spina Bifida

Etiology

The most common type of spina bifida is meningomyelocele. This involves both the meninges, or spinal nerves, and portions of the spinal cord protruding outside the spinal column. It is always associated to some degree with neurological deficit. Besides absence of sensation below the level of the protruding nerves there is also urinary and bowel incontinence. Consequently, sport and exercise activities must be planned according not only to neurological deficits but also to lack of urinary and bowel control. Prevention of possible incontinence problems needs to be addressed before activity begins.

Activity Suggestions

Properly planned sport and exercise participation is encouraged to prevent obesity and inhibiting fatigue. Middle and secondary school students will usually be in a wheelchair when participating in sport and exercise activities. Activities such as--

- archery
- bowling
- fencing

should be used to promote upper extremity strength development.

Activities which develop musculature of the trunk are extremely important. Exercises such as--

- trunk bends or flexions
- lateral flexions and rotations
- abdominal thrusts (arching lower back)

can be done right in the wheelchair. Initially, these activities should be done 15-25 times/day. After a conditioning period of a month, resistance can be added to shoulders for additional trunk overload.

For overall endurance development, activities such as--

- arm pedalling or cranking
- push-pull motions on arm and cycle ergometers
- rowing motions with arms

can be quite helpful. However, the student should probably not try to transfer to the rowing apparatus but instead perform the rowing motion with the arms and upper body while sitting in the wheelchair.

Intensity and Duration

Intensities should be moderate to moderate plus, with heart rate between 150-170 bpm. RPE should be around 13. Duration should be approximately 3-5 minutes for the deconditioned or for students who have not been engaging in any physical activity. After the first month these intervals can be increased by 1-2 minutes every couple of weeks until up to 30 continuous minutes can be performed.

Breaks between intervals during the first month should be approximately 1-2 minutes depending upon fatigue in arms and upper body. Usually 4-5 intervals of 3-5 minutes during the first month will be effective and yet not result in abnormal muscle stiffness or fatigue. Frequency for an exercise and sports participation program should be at least 3 days/week in order to gain physical benefits.

Warm-up

Warm-up should be approximately 3-5 minutes and involve the primary muscles that will be involved in subsequent activity. Such activities usually include:

- arm circles, from large to small, for the first minute or two

- push-pull motions at chest level to warm up trunk musculature

- trunk rotations

- front and side bends with the torso to prepare muscular and cardiovascular system for subsequent activity.

The following static stretching exercises should be done--

* #1, 2, 3

Cool-down

Cool-down activities should include 2-3 minutes of slow movements similar to those done during the sports and exercise period. Perform the same static stretches done during warm-up, but only for 60 seconds per muscle group.

Environment

Optimally, temperature and humidity should be moderate; however, colder or hotter conditions within reason will not significantly affect physical responses for students with spina bifida. Probably the only concern would be an increased chance of incontinence secondary to excessive fatigue in a hotter environment.

SUMMARY

* Student is usually using a wheelchair.
* Sport and exercise activities must be planned around neurological deficits and lack of urinary and bowel control.
* Promote upper extremity strength development in appropriate activities.
* Include calisthenic activities for the upper body.
* Calisthenic activities and movements should be done 15-25 times/day.
* Add resistance after the first month for additional overload of the trunk.
* Use arm pedalling or cranking motions for endurance development.
* Intensities of activities should be moderate to moderate plus, with pulse rates 150-170 bpm and RPE around 13.
* Include 4-5 intervals every other day of 3-5 minutes/interval for the first month.
* There should be a 1-2 minute break between intervals.

- Goal is 30 continuous minutes at proper intensity in activities emphasizing endurance.

- Warm-up should be approximately 3-5 minutes involving the primary muscle groups to be used subsequently.

- Cool-down activities should be 2-3 minutes of slower movements similar to those done during the sports and exercise period.

- Static stretching for shoulders and lower and upper back areas for 30-60 seconds is strongly encouraged.

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